AMERICAN GAS ASSOCIATION MONTHLY

Vol. III No. 5

May, 1921

"With proper public cooperation, the nation today faces the greatest era of development of electrical, gas, telephone, and transportation facilities in history. During the war the federal government held back such work. The nation is "under built," the demand for those economical services far exceeding plant capacity. The great farming areas are yet to be electrified; the railroads have not been electrified, except for a few short stretches; the smoke and grime of the cities has not been done away with; the greater part of industry is yet to be given economical heat and power; coal, oil, and water power have not been harnessed in a way to bring about the greatest economies, efficiencies, and greater good to the nation. Electricity and gas, great as are their uses, are only in their preliminary stages and this great development work, still in its babyhood, which has made such tremendous strides through private initiative backed by a public ownership of securities held by a great army of people, will go on and bring to industry a continuance of that enterprise and economic and efficient management such as has revolutionized the world in forty years."

—*Charles A. Munroe.*

ENTERED AS MATTER OF SECOND CLASS AT THE POST OFFICE, EASTON, PA.
Acceptance for Mailing at Special Rate of Postage Provided for in Section 1103, Act of October 3, 1917, Authorized July 10, 1919

Dont wonder why you never receive your MONTHLY when you have changed your address and have failed to notify this office. :: :: ::

A. G. A. Engineering Service for Member Companies

General Engineering Service
A. I. Phillips

Mr. Phillips' services will be helpful in a consulting capacity and in the field in such matters as plant operation and efficiency, revision of service standards, and operating problems generally.

Industrial Fuel Engineering Service
W. A. Ehlers

Mr. Ehlers' services provide expert advice and assistance in the field in promoting the use of gas for industrial purposes; in solving special industrial fuel problems, making field surveys and active solicitation of such business.

RATES FOR THE SERVICE

For the first five consecutive working days, or less..... $20.00 per day
Next five consecutive working days thereafter..... $15.00 per day
Plus traveling and living expenses of engineer in the field
Contract to take the service for a total engagement of 30 working days during 1921..... $15.00 per day
Limited to ten working days in any one engagement

CONTENTS

VOLUME III MAY, 1921 NUMBER 5

PAGE

Accident Prevention in the Gas Industry 271
Affiliated Associations 311
American Fire Losses for Five Years 281
Causes of Sticking Charges in Vertical Retorts 266
Don't Forget the Annual Canadian Convention 265
Editorial—The Latest Bone of Contention 258
Employment Bureau 320
Executive Committee Completes Program (Technical) 299
Gas Chemists' Handbook Notice, The 310
Gas Situation To-day, The 259
Good News 284
Good-Will Advertisement (No. 13) 286
Manufacturers 293
Modern Automobile Spring Manufacturing 292
Our Advertising Service 284
Practical Continuous Recording Calorimeter 309
Publicity by Means of Trade Papers 292
Public Utilities and Reconstruction Problems 274
Questionnaire of Committee on Fire Insurance Rates 282
Question Box 312
Rapid Determination of Water in Tar Emulsions, The 305
Rate Increases Secured, Current List No. 44 318
Recuperators and Regenerators 288
School Children Visit Plants 285
Section Notes (Manufacturers) 298
Southern Gas Association Notice, The 270
Storeroom 275
Statement of Principles, A 294
Time Required to Install Gas Appliances and Piping 291
Treatment of Contaminated Water at Reading 302
Two Advertisements in One 285
What Do You Do with Your Complaints? 283
Window Displays 287

AUTHORS

Bains, Geo. B.—Treatment of Contaminated Water at Reading 302
Beebee, Alex. M.—Causes of Sticking Charges in Vertical Retorts 266
Fogg, Oscar H.—The Gas Situation To-day 259
Heins, J. W.—Storeroom 275
Loebell, Henry O.—Recuperators and Regenerators 288
Odell, W. W., and Thiele, E. W.—Rapid Determination of Water in Tar Emulsions 305
Rancke, Louis N.—Practical Continuous Recording Calorimeter 309
Smith, Fred. M.—Accident Prevention in the Gas Industry 271
Warburg, Paul M.—A Statement of Principles 294

FOR STATEMENTS AND OPINIONS CONTAINED IN PAPERS AND DISCUSSIONS APPEARING HEREIN, THE ASSOCIATION DOES NOT HOLD ITSELF RESPONSIBLE

AMERICAN GAS ASSOCIATION MONTHLY
OFFICE OF PUBLICATION, EASTON, PA.
SUBSCRIPTION RATE *3.00 PER YEAR*

Entered as Matter of Second Class at the Post Office, Easton, Pa.
Acceptance for Mailing at Special Rate of Postage Provided for in Section 1103, Act of October 3, 1917, Authorized July 16, 1918.

American Gas Association Monthly

ADDRESS ALL COMMUNICATIONS TO THE AMERICAN GAS ASSOCIATION, INC., 130 E. 15th STREET, NEW YORK, N. Y.

Vol. III MAY, 1921 No. 5

The Latest Bone of Contention

What are you doing to set your public right on the service charge hoodoo? There are those among your consumers who have found it less of an effort to believe the voice of their pet prejudices concerning the case of the utilities, who have preferred to escape the truth;—to those who will not listen to any view-point save their own, the service charge is only another something over which to bicker. But on the other hand, there are many who do not know, and who no doubt have a fair-minded desire to understand, and it is for the attitude of these that we are responsible.

Every gas man should be versed in the whys and the wherefores of the service charge; every gas company should educate its employees,—an argument that sounds like an old and worn-out story, yet a caution upon which this Association will harp until the dawn of that public good-will for which we are earnestly working, when the utilities will be treated as honest, God-fearing industries.

A large share of the opposition rests upon trained minds, people who are taught to think. By all the laws of reason that should be fortunate. Do you know that there are school teachers, for example, men and women who deal in logic, who know nothing at all of our problems, or what knowledge they have is founded upon some unreasonable prejudice; and they are among those who should be open to conviction, because they can think (barring those among them who won't).

Go out among your consumers,—send your people,—write to them,—talk to them,—spend your money on getting the truth to those of them who will listen. Once you have convinced the willing, you have organized a formidable army to persuade the unwilling.

And now it is the service charge. Do you really understand it yourself? If you don't, get busy. And when you are convinced yourself, sow your knowledge broadcast, and you will reap its value an hundred-fold.

". . . and to continue such effort and to improve and perfect it is just as essential to our prosperity and just as necessary a part of our operations and activities as any which enter into the manufacture and distribution of gas. . . ."

AMERICAN

GAS ASSOCIATION

MONTHLY

Vol. III MAY, 1921 No. 5

The Gas Situation To-day

Remarks of Mr. Fogg before the Wisconsin Gas Association, Milwaukee, Wis., March 22, 1921.

THE gas industry is confronted by a financial situation which calls for a speedy solution. We need about $250,000,000 to meet the requirements of the country for gas service. Public utilities as a group need nearly $900,000,000 to supply their service to the one and a quarter million homes that must be built to provide adequate housing facilities in the United States.

There are only two ways to get that money from investors, and it seems to me that both must be brought into play. First, the courts and commissions must see to it that a rate of return sufficient to enable utility securities to compete with other issues is allowed such companies, or those securities cannot be expected to attract investors. Second, these securities must be liberated from the bondage of tax discrimination that is now cutting them off from the life blood of new capital which is flowing in ever increasing volume into the federal, state and municipal securities and others which comprise the growing class which are exempt from federal taxation. We are demanding that this differential be removed, either by similar exemption of utilities securities from such taxation, or by placing tax exempt securities in the taxable class. We are not demanding any preferential treatment of utilities securities, but only that they be given a fair chance to compete for the investors' capital with the securities of other enterprises no more essential to the prosperity and development of the nation than our own. This situation, together with other considerations concerning the need for the

strengthening of the credit of gas companies, has been put before the Chamber of Commerce of the United States, Committees of Congress and other bodies. They are important features of a general program to which we feel it is necessary to bring the most aggressive and concerted action possible, and in these and other matters which relate alike to all of the utilities, we are working in the closest and, I believe, the most effective cooperation with the other great National Utility Associations of the country.

At the beginning of this month 1,600 rate increases had been granted to 865 gas companies since the middle of 1917. That means that of these 865 companies, 471 had received two rate increases; 196 had received three increases; 52 companies had received the fourth increase, and 16 companies the fifth. So that, in spite of long delays on the part of the regulatory authorities in granting the relief that was so urgently needed, and while the price of gas in some places is still far from adequate, yet ultimate recognition of the rate necessities of the gas industry is quite generally being given. State commissions as well as the thinking public are coming more and more to realize that gas companies must be maintained in a prosperous financial condition if they are to render good and economical service. "No service will be rendered by the Commission to the patrons of the utilities by a policy tending to impoverish and embarrass the latter," said Chairman Hill of the New York Second District Commission in a recent decision.

While the situation is thus encouraging, we shall nevertheless find it necessary to emphasize that a very decided lag occurred between the time when the cost of all commodities went sharply upward and the time when gas rates generally were permitted to respond to this tendency. The average of gas rates throughout the country continued to decline until the middle of 1917, although the five major items entering into the cost of living had increased nearly 40 per cent. by the middle of 1917 over the average of the middle of 1914. By 1919 the average of the major items entering into the cost of living had increased 73 per cent. over 1914, while the average rates for gas in one hundred cities most broadly representative of conditions throughout the country had increased only 9½ per cent. over 1914. Our expenses followed the general rise in the prices of commodities, but our revenues did not. Our surpluses were depleted, and we have been left poor at a time of unprecedented commercial prosperity. Not only must we obtain a reasonable present return on our investment, but our former sound financial condition must be reestablished if we are to extend our service and be of most benefit to our communities.

Is it any more than right to insist upon a recognition of these facts when demands are voiced for a reduction in the price of gas? Is it any more than just to demand that in the future readjustment of rates there will be compensation for the heavy losses sustained through the long period of ruinous prices which gas companies were compelled to pay for their essential materials, with the average rate for gas not standing still, mind you, but actually declining until the middle of 1917, and then increasing only to an ex-

tent which was negligible in comparison to the advancing cost of all other commodities and materials?

The growing recognition by regulatory authorities of the justice and desirability of the fixed service charge and the number of cases in which such a charge has been allowed, particularly during the last year, is one of the outstanding features of the rate situation. Our records show approximately one hundred and fifty places supplied with manufactured gas in which a readiness-to-serve charge is now in effect. These are spread over twenty-two different states. If we go into the communities supplied by natural gas, we find many more instances of the service charge in use.

That our business has been cramped by rate schedules which have forced one class of consumers to bear the losses sustained in serving another is largely our own fault. In the past we have been bound down too much by tradition, and the electric companies, unhampered by precedent, have far outstripped us in the establishing of a rate structure. In fact, there are many who believe that the comparative prosperity of such companies to-day is due to the elasticity and sound basis of the method they have generally adopted for charging for their service.

We in the gas industry did not recognize and agree upon the propriety of a service charge until after our companies had generally come under the jurisdiction of State Commissions, and we now must overcome the inertia of precedent and convince these regulatory bodies of the justice and equity of our claims. And they are beginning to recognize them. In deciding a recent case, the Second District Commission of New York said:

> "The petition and practice of this company suggests a minimum charge per month. A service charge seems to be much fairer. Thus expenditures which are necessarily required irrespective of the amount of consumption by the individual consumer, should properly be borne by all the consumers irrespective of the amount of consumption. . . . It was, therefore, suggested by the sitting commissioner on the hearing that instead of a minimum charge a service charge should be substituted, and this met with the approval both of the company and the municipality."

It may be interesting to you to know, if you do not already, what the general tendency has been in the readjustment of standards to a more economic basis. During the past year, four states have adopted a new heating value standard of 540 or less.

New Jersey—reduced from 600 B. t. u. to 525 B. t. u. minimum in August, 1920.
Wisconsin—reduced from 600 B. t. u. to 520 B. t. u. average in September, 1920.
Pennsylvania—reduced from 570 B. t. u. to 520 B. t. u. average in December, 1920.
North Carolina—adopted 540 B. t. u. average in January, 1921.

In addition the Missouri Commission fixed an average value of 450 B. t. u. for Cape Girardeau, Mo., in December, 1920, and the Washington Commission fixed the maximum and minimum heating value limits for three of the cities in the state as follows:

Seattle—between 500 and 530 B. t. u.
Spokane—between 520 and 560 B. t. u.
Tacoma—between 450 and 475 B. t. u.

and numerous other local adjustments have taken place.

Experience during the past year has fully confirmed the judgment of our best gas engineers that the consumers would not suffer from the heating value reductions but, on the contrary, should receive a better service. Many of these recent

reductions have come during a season of increasing sales. Our distribution systems have in many cases become entirely inadequate to handle the large demands made upon them, and we have not had the money to make the needed improvements. We have thus had pressure troubles in some places, and these have naturally been laid to the change in the calorific standard. In other cases, the companies have failed to adjust the consumers' appliances to the new standard, and the consumers have been justly dissatisfied. We cannot make a change in service conditions without the necessity of adjusting our consumers' appliances. But the lower heating value in itself has not, to our knowledge, been the cause of any just complaint.

According to the statement of the chief engineer of the New Jersey Commission, every complaint received by the Commission has, upon investigation, been found to have been caused by poor pressure or appliances out of adjustment, and in no case has the heating value of the gas been to blame.

In short, uniformity of conditions, adequate pressure and appliances in good adjustment constitute the main essentials of good service. And it is not only right, but it is to our interest, that the consumers receive such service.

A utility labors under an almost insurmountable burden if it loses popular good will. Good will can only be gained through good service, and it is, therefore, essential that we pay the greatest attention to it. Some of us are apt to think that service matters are all right as long as the consumer gets gas. But we have asked for and received "adjustments in standard" on the ground that we could give better service. So it is up to us to make good our promises and give such service.

At last we have really gotten under way on that all important question of valuation. There have long been too many differences of opinion in the gas industry itself as to what was the proper basis upon which to establish the valuation of public utility property. Then within the industry have there been divergent views upon such important and fundamental subjects as depreciation. Gas companies appearing before commissions or fighting their battles in the courts have not always rested their case upon a sound economic basis and sometimes they haven't spoken the same language at all. So it is not surprising that decisions have been rendered which are not in accord with the true economic structure of our business. We are approaching this important subject through a committee of men who have given to it the utmost attention and the closest study and who very fairly represent, we believe, the different localities of the country and their varied interests. The effort will be to come to agreement upon the fundamentals of valuation and the accomplishment of that object will remove what has long been a cause for dissatisfaction and discord within the gas industry.

So here again we are working for unity within the gas industry and a coherent, sane expression of its views; first, agreement upon the fundamentals of valuation and then concerted action to secure recognition of the principles which are believed to be right.

I want to say a very brief word on some of the regular Association activi-

ties, but more particularly upon some of its service features.

Such activities as those carried on in the several sections have long been accepted as necessary features of Association work, but I think that never before have they been prosecuted along such valuable lines, nor have they been so replete in practical value to the industry. Reduced to the minimum amount of routine, stripped of red tape, the sectional activities are focussed upon the essential things and Association work is no longer the perfunctory performance of detail or the ponderous discussion of abstract matters. It has been brought to the level of practical accomplishment, reached in a business-like way and conducted with regard to the things that can be done to advance and develop the gas business in the most direct way.

The service facilities of the organization have been strengthened by the addition of a gentleman who, I believe, is known to many of you—Mr. A. I. Phillips, formerly of the Bureau of Standards, who has had an enviable experience in matters relating to rate making, standards of gas quality and service and engineering phases of the gas business.

With Mr. Ehlers in the industrial fuel and utilization end of the business, and Mr. Phillips in the work which I have described, we have available competent men to go to the aid of our company members wherever their services are needed and at cost—not profit—to the Association.

Our general service letters giving notice of the most recent and most important decisions of the courts and commissions, and other matters of first interest to our company members, have met with a reception that is most gratifying. I think you would be surprised to know to what an extent has grown the demand for information and assistance which comes to our headquarters from all sections of the country. It is our unalterable policy to try to get this information back to the men who want it with the least delay and in the most practical, helpful form. Sometimes we find inquiry of others necessary before replies can be made, but we are trying very hard to develop this service to a point where the information at hand in the headquarters of the Association will enable us to make prompt and accurate response to all calls that are made upon us.

In several sections of the country at the present time, we find organized attempts being made to array the force of public opinion against us and to obscure the public view as to the true merits of the utility situation. Our adversaries are formidable ones. As keen students of mass psychology they do not hesitate to spread false ideas, nor does conscience enter into their appeal to prejudice. We have at hand weapons with which to disarm and defeat unscrupulous agitators, but as an industry, generally speaking, we are not making efficient nor skillful use of our force. Until this industry realizes that the expenditure of money for constructive publicity; in short, that dollars and cents for putting the truth before the public are just as necessary as dollars and cents for coal, or wages, or oil—until that time; our industry collectively will be on the defensive.

We must fight the appeal to prejudice with facts and an appeal to reason. That

is our available weapon, but we have used it sparingly. And this is nothing more than another appeal for better and more publicity; for a more unified effort in the creation of proper public relations. It has become an old, old subject. Everybody agrees that it ought to be done, but it is time that we understood that more than agreement is necessary—money and work are required. The companies that recognize the necessity for the expenditure of money for good will advertising and the proper presentation of the facts to which the public is entitled, will have an easier journey over the road to normal times than those who sit silent and unheeding in the face of malicious attack and misrepresentation.

Nor is this a plea for the written word alone—the spoken word is just as necessary—just as effective—sometimes very much more so. Constructive publicity means the education of the public in the true economies of the utility business in the broadest possible way—and utilizing every practical agency for that purpose. One of the most important and most neglected of these is, in meeting the public face to face and giving them the facts by word of mouth. It is for you gentlemen in the utility business to tell the public the things they ought to know about your business—nobody else is going to do it; it's your job. It is encouraging to find that gas men are overcoming their diffidence—are becoming more willing to talk in public—and are appearing in greater number before gatherings of their people, meetings of civic organizations, clubs and the like—and putting up the facts in a personal, human way.

With full recognition of the strides which have been made in this direction during the past year and the immense value of the constructive publicity and good will work that has been done, I say that to continue this effort and to improve and perfect it is just as essential to our prosperity and just as necessary a part of our operations and activities as any which enter into the manufacture and distribution of gas to the public, and I hope that there will be a sufficiently broad recognition of this fact to assure the favorable reception of plans, now in the making, through which we hope to see the gas industry united in the effort to win public confidence and regard.

Our industry is going forward at an increasing pace. There has been developed a more favorable public opinion, a better understanding upon the part of the public and regulatory authorities and the more secure establishment of those principles upon which rests the stability of this great industry. If we have had a part in that, we believe that our work is worth while. We have made a breach in the stone wall of indifference and prejudice, but we haven't demolished the wall and we won't in another year or ten. But it has been shown that it can be done and that sustained, concerted effort will do it.

That effort can only be made effective by a united industry, and it is upon that point that I would like to close—the solidarity of the gas industry.

One of the oldest industries of the country—to-day one of the Nation's most essential industries—its history shows lack of cohesion, lack of unity and a misguided independence borne of a conservative past. Even with the example of modern industrial enterprises uniting, banding together for greater strength and progress, we sat too long behind our

grimy windows, content in our isolation, supreme in our self-sufficiency. That day has gone by. Perhaps its passing has been hastened by a world unheaval where the instinct of self-preservation draws people together in a common cause. But it has been more due to the vision and courage of men—the founders of this Wisconsin Gas Association and others—who saw in the extension of the association idea the ultimate dissolution of the insularity which had been our industry's curse. Your association, the various state and district associations throughout the country, have performed a service to the industry the value of which is seldom realized.

Instead of struggling along by ourselves independent of each other, we see a unified gas industry, not as a far distant prospect, but as something soon to be realized. With an industry completely organized, its full strength combined for the legitimate advancement of its interests, and the legitimate *protection of* its interests, where need be, then many of the complexities of our business will have disappeared and we shall go forward more surely to the fulfillment of our ideals in a service that is indispensable to the domestic and commercial life of the nation.

And that is why we are fighting hard to make the A. G. A. 100 per cent. representative of the gas industry of this country. It isn't enough that we now represent 85 per cent. of the total volume of artificial gas sold in the United States, however gratifying that may be. It has got to be 100 per cent. and so I have no hesitation in calling upon you to help. There are here, as in other sections of the country, companies who have yet to be persuaded, yet to be convinced, and the help you can bring in that effort will be a service to the industry that is beyond reckoning.

Don't Forget the Annual Canadian Convention—Montreal, Canada August 25th-26th, 1921—Headquarters Windsor Hotel

For the benefit of members and friends living west, south and north of Montreal a special boat trip is being arranged with the Canada Steamship Lines, leaving Toronto August 23rd and proceeding via Lake Ontario, Thousand Islands, St. Lawrence River and Rapids to Montreal.

The Canadian Association requests that all reservations both for hotel and boats be made to the secretary as early as possible.

Causes of Sticking Charges in Vertical Retorts

ALEXANDER M. BEEBEE,
Assistant Superintendent of Gas Manufacture, Rochester Gas and Electric Corporation

THE causes of sticking retorts at the West Station Vertical Retort Plant are many, and as a result the solution of this troublesome and most annoying, as well as dangerous and expensive difficulty was a considerable time in being reached, and was only realized after numerous tests and careful watching of results.

Perhaps before going into the causes of a "sticking retort," as we have found them, a brief description of the principles of coal gas manufacture, and the various methods of coke removal will aid in the understanding of the subject, as well as what is meant by a "sticking retort."

Coal gas manufacture consists essentially in the distillation of coal in retorts; or perhaps more commonly speaking, the cooking of coal in large ovens, and the vapor given off from the coal in this cooking process being collected, is the raw gas from which the finished gas is made. The product left in the retort is essentially carbon and known as coke.

There are many types of retort settings and each has some definite means for the removal of the coke from the retorts or ovens, at the end of the cooking or carbonizing period. The method of coke removal depends to a considerable degree on the type of the retort setting. The older type of plant, such as was in use at East Station up till the time West Station was built, consisted of retorts laid horizontally and open only at the front end, from which the coke was raked by hand; a very hot, dusty, and disagreeable job. Later on, this process was improved by the use of a mechanically operated raking machine, which aided considerably in the bettering of working conditions. This still required some little period to remove the coke, as many strokes of the rake were necessary to clean the retort, which not only took time, with its corresponding loss of plant capacity; but also furthered considerably the wear and tear on the retort itself.

Settings of later types consisted of retorts laid horizontally, but with openings at both ends, so that the coke would be pushed out by one stroke of a large mechanically operated pushing arm. This method has been very successful, and the modern by-product coke oven is a modification of this style, being really a horizontal retort of huge dimensions, and employing a gigantic pushing machine for the removal of the coke. Usually the main product from a retort plant has been the gas evolved from the coal, and the remaining coke has been considered a by-product; while in coke oven operation, the reverse has been true. However, from the above one will readily see, that the principles of coal gas manufacture in retorts, and modern by-product coke oven operation, are very similar; and both, as time moves on, are becoming more and more closely related, and interchangeable in their aims, as regards their main product, coke or gas.

Shortly after the adoption of the "horizontal through" retorts, as the retorts open at both ends are known, came the vertical retorts, which are practically the same thing, being open at both ends, except that they are set vertically, and instead of requiring huge mechanical means for the removal of the coke, rely

on the gravity of the coke to remove it from the retort, after the opening of the bottom lid. This method, not only does away with the huge equipment necessary to discharge a horizontal retort or oven, but also eliminates the wear and tear on a retort wall caused by a mechanical coke remover.

This principle of coke removal certainly has all the theoretical ear marks of an ideal system. However, when West Station was started, it was soon found that theory and practice did not always pan out, and that many of the charges failed to drop out of the retort after opening the lower lid. These "stuck" charges are removed by poking from the bottom, which is not only a very dangerous practice, and also most annoying, as it ties up the operation considerably, which means loss in plant capacity; but it also causes considerable damage to the plant equipment. The retorts are opened in batteries of three at a time, and if one or two should drop, it means that the hot coke car, and lower retort iron work will be subjected to considerable heat from the hot coke of the dropped retorts, while waiting for the stuck charges to be removed. This was particularly ruinous to the hot coke car equipment, for their plates became hot when delayed too long, and consequently were considerably distorted in the quenching process.

These difficulties, if unsolved, presented a serious drawback to vertical retort operation, and considerable experiment and thought were given to the problem, but it was some time before any results were realized, as the causes were many, and each in itself is capable of producing considerable difficulty.

The retorts in the West Station installation are about 22 feet 5 inches in length and proportioned about as shown in Fig. 1, with a slight taper from the top to the bottom, to aid the coke charge in falling, and with gas off-takes from the top and base of the retort. Fig. 2 shows a cross section of the whole setting, and shows the position of the retorts in relation to the rest of the settings.

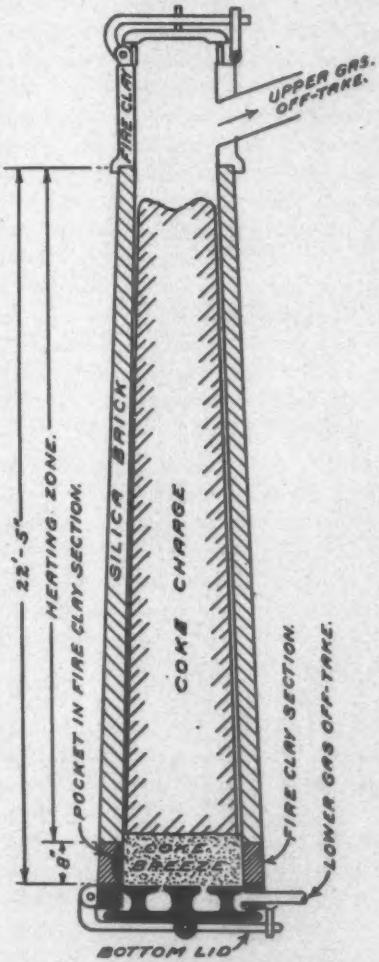


Fig. 1.—Typical Vertical Retort Setting

The retorts are built up of silica brick with the exception of the bottom 8 inches next to the lower lid, which is of fire brick. Before a charge of coal is placed in the retort, about 10 inches of coke breeze is put in (coke breeze is another name for small coke), in order to keep the coal up in the heated zone of the retort, and thus insure that the complete coal charge will be properly carbonized at the conclusion of the draw. If this breeze mat were not used, the coal in this lower area, which is comparatively cold, would be only partially carbonized, and being in a sticky plastic state, would cement itself to the sides, causing the charge to stick. This breeze area theoretically was supposed to prevent any possibility of a sticking retort. Soon after starting our operation, however, it was discovered that such was not the case and that on an average between 35 and 40 per cent. of our retorts stuck, and that there must be something further that caused the charge to fail to drop.

After considerable investigation and careful watching, the following conditions were proven to be capable of causing, or helping to cause a sticking retort, and they are listed in the order of their effectiveness in aiding such a condition. The first item, of course, is self-evident and did not take long to find out.

(1) Absence of the breeze mat at the bottom of the retort, or failure to have sufficient breeze to make the mat of proper depth. As the amount of breeze put into each retort is mechanically measured and is a regular part of the charging operation, this is unlikely to be the cause of continued trouble. However, failure in the proper completion of this operation is more sure than anything else to cause a sticking retort. In case of trouble this is one of the first things to investigate, to make sure that each retort is getting its proper amount of breeze. This was one of the first things that we looked to, but still there were other factors that seemed to be nearly equally effective in preventing the coke charge falling.

(2) The failure to have a proper heat condition in the retort will probably, more than anything else, aside from the absence of breeze, cause a charge to stick. The reason for this is obvious, for unless sufficient heat condition is reached, the breeze mat will not have become sufficiently heated by the time the end of the charge has arrived to drive off the high boiling point tars that have condensed in the breeze during the earlier part of the charge. If the temperature is not sufficient to drive off these tars, the breeze mat remains a plastic tarry mass that adheres to the side of the retort bottom. It has been proven beyond a doubt that a proper heat condition in the retort is of primary importance in maintaining good dropping of charges. Another reason why a well burned off charge will drop better, may be because such a charge is apt to be more thoroughly shrunk away from the sides of the retort, and hence its whole weight is supported on the breeze mat.

(3) Careful watching showed that the breeze mat condition also had considerable to do with a stuck charge, for we still had trouble in spite of good retort temperatures. With this in mind, attention was turned to the proper treatment of this breeze mat. Since coke breeze in itself should cause no trouble, it must be

the mixture of the breeze and various tars from the coal that caused the trouble, and our next step was to prevent as much as possible the tar coming in contact with the coke breeze. Coke breeze necessarily contains over 10 per cent. moisture, as after quenching the small particles of coke do not have a hot center which will drive off the moisture from outside, as is the case with larger pieces of coke, which is the theory of proper coke quenching. As a result this wet breeze, when put in the bottom of the retort, being colder and slower to rise in temperature, due to this moisture, would condense tar from gas passing down through the breeze to the lower off-take; and as this moisture in the breeze would absorb considerable heat itself in vaporizing, the breeze mat at the end of the charge would not be at a temperature sufficiently high to vaporize all these tars and the sticky mass resulted. The solution to this was to dry the breeze and then heat it to about 230° before putting it into the retort. This was carried out by installing nearly 2,000 feet of high pressure steam coils in each of the three breeze bins, and as a result the breeze moisture is reduced to around 1 per cent. and the temperature of the breeze before going to the retort is raised to some 230°.

(4) It was further found that the fineness of the coke breeze also had its effect

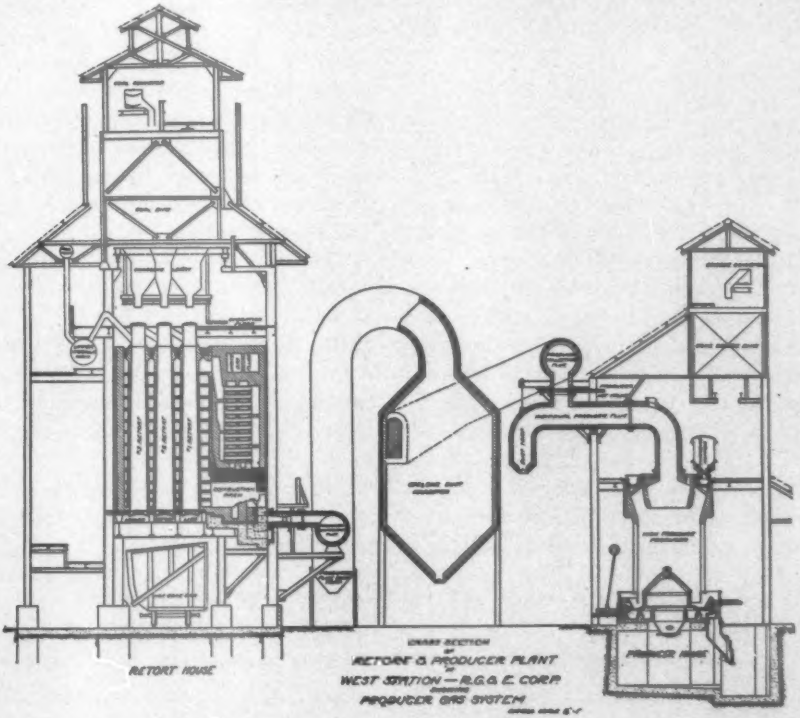


Fig. 2.—Cross Section Drawing of Producers and Retort Settings, West Station

on the mat, and the reason for this is clear. If large breeze is used, it provides a freer medium for the gas to pass through the breeze mat to the lower gas off-take from the retort, than would be the case if smaller breeze were used. The more gas that passes through the mat, the more tar will be condensed, and hence we found that using a small grade of breeze helped our difficulty, as it tended to force more of the gas up through the retort and out of the upper gas off-take, thereby reducing the tar condensed in the mat.

(5) The fifth solution was really an outgrowth of the preceding one, in that it consisted in manipulating the valves in the lower off-take pipes; by keeping these valves closed at all times as far as was possible, and still not cause the lower lids to leak, so as to provide additional means to force more of the gas to take the upward path through the retort to the upper off-take pipes.

(6) A glance at the sketch of the retort section shows that the bottom 8-inch section is made of fire clay. This portion is subjected to more or less expansion and contraction, and also to abuse when poking retorts; and as a result pockets had been worn into it as shown in black in Fig. 1. These pockets made ideal resting places for the breeze to catch and cause a stick. By keeping these sections patched, so as to provide a smooth surface, we found that this also helped in the elimination of our trouble.

By carrying out each of the above ideas, it seems we have operated sufficiently long now, for us to make the perhaps unwise statement that we believe we know what will cause a sticking retort.

The application of any one of the foregoing remedies in itself will not clear the situation. This was one reason why our problem was so long in solving, as any one correction made did not seem to cause any material benefit, but when taken all together the situation changed, and our sticks reduced from around 35 per cent. to an average of 5.7 per cent. when on our full plant operation.

The above, while not having completely eliminated sticking retorts, has materially reduced their number; and those few that still refuse to drop are of such a nature that they are easily removed, with almost no delay.

The long hard poking that we used to endure, has been completely eliminated. If we do run into sticking retorts we can almost invariably trace it to one of the above causes, and eventually remedy the trouble, all of which has been conducive to smoother and better plant operation.

The Southern Gas Association will hold its meetings at the De Soto Hotel, Savannah, Ga., May 31, June 1 and 2, instead of May 24, 25 and 26, as previously advised.

GENERAL

CHAIRMEN OF GENERAL COMMITTEES ORGANIZED TO DATE

Accident Prevention—CHARLES B. SCOTT, Chicago, Ill.
Amendments to Constitution—WM. J. CLARK, Mt. Vernon, N. Y.
American Engineering Standards Committee, Representative on—A. H. HALL, New York, N. Y.
Award of Beal Medal—CHARLES A. MUNROE, Chicago, Ill.
Calorific Standards—J. B. KLUMPP, Philadelphia, Pa.
Chamber of Commerce, Representatives in—GEORGE B. CORTELYOU, New York, N. Y.
Convention Program—J. B. KLUMPP, Philadelphia, Pa., G. I. VINCENT, Vice-Chairman, Syracuse, N. Y.
Cooperation with Educational Institutions—J. A. NORCROSS, New Haven, Conn.
Educational—WALTON CLARK, Philadelphia, Pa.
Finance—E. H. ROSENQUEST, Bronx, N. Y.
Gas Safety Code—W. R. ADDICKS, New York, N. Y.
National Fire Protection Assn., Membership in—W. R. ADDICKS, New York, N. Y.
Nominating—CHARLES L. HOLMAN, St. Louis, Mo.
Rate Fundamentals—R. A. CARTER, New York, N. Y.
Standard Gas Appliance Specifications—W. T. RASCH, New York, N. Y.
Standard Pipe Threads (International)—W. CULLEN MORRIS, New York, N. Y.
United States National Committee of the International Commission on Illumination, Representatives on—HOWARD LYON, New York, N. Y.

Accident Prevention in the Gas Industry

FRED M. SMITH, *Bureau of Safety.*

Presented before the Joint Convention of the Illinois Gas, State Electric, and Electric Railways Associations, March 15-16, 1921.

SOME six years ago I was employed by a large utility corporation in the capacity of claim agent. This company, besides supplying electrical energy to about seventy communities and operating two city street car systems and an interurban line, manufactures and distributes gas to nine of the principal cities in this territory.

While serving as claim agent for this company I helped to perfect, under the direction of the Bureau of Safety, an organization for the prevention of accidents and thus came into direct contact with all of the accidents occurring in the company. Its accident record was similar to that of most other companies operating combined utilities inasmuch as the accidents growing out of the operation of the electrical and traction properties far exceeded in number and seriousness those that occurred in the manufacture and distribution of gas, and also like many companies of this character where similar records occur, the gas properties were at first sadly neglected by the Safety Organization. Efforts were centralized in the electric and traction branches of the work and the employees in the gas plants and distribution departments were given very little attention. We were brought to realize this neglected duty by a very serious explosion in one of the gas plants. Considerable property damage resulted and two men were badly injured. An investigation showed that the principal causes leading up to the explosion were a combination of physical defects in the equipment and failure on the part of the plant foreman to enforce established plant rules. These causes would not have existed if closer attention had been given to safety and fire inspections and assurance of due regard for the rules by the employees through the influence of safety teachings. A disaster is sometimes necessary to impress employers with the importance of and

necessity for definite and systematic safety work. This is particularly true on those properties where accidents infrequently occur.

This introduction to my subject illustrates one company's experience in belittling and neglecting one very important branch of accident prevention work, that of the gas utility. An experience that many other gas companies have had and will continue to have until they are brought to a realization of their mistake through some disaster resulting in either loss of life or damage to property, or both. It is true that the gas industry as a whole does not give to safety work the proper earnest attention nor employ the systematic methods that other branches of utilities do. My observations have led me to believe that the reason for this is twofold:

First: Very serious accidents wherein loss of life and large property damage occur, are few as compared to other industries. The bulk of accidents that do occur are not spectacular and therefore the need of organized effort toward accident prevention is lost sight of by the owners or executives. An analysis of the accidents in one company can be cited as an example to show that accidents in this industry are more serious than generally considered. Out of five hundred and fifty accidents, 40 per cent. resulted in lost time with an average of six days lost time per accident. This condition is not realized by the average executive. If such companies would carefully compile their accident records, analyze them and obtain figures showing their costs, lost time and the resultant loss of efficiency in operation and compare the knowledge thus obtained with the experience of those companies which have organized accident prevention, they would readily see their own shortcomings.

Second: Another reason for this inactivity is that skeptical, indifferent attitude that some executives have toward safety, a state of mind, which, I am hapyy to say, is being gradually overcome by the steady advancement of safety work and the piling up of convincing arguments in its favor. Success in accident prevention can be assured only by starting with the head of the organization. He must give it his earnest support and must consider it of equal importance to the other departments in his company. He must believe in it and must realize that safety work is not a one-man job and that his attitude with respect to it must be manifested in such a way that his department heads, superintendents and foremen will be influenced by his example. The degree of interest in the work by his immediate subordinates will be governed by his own interest and their enthusiasm will be reflected in the attitude of the employees under them. The efficiency of the employee is generally in direct ratio to the policies of the individual who directs him, and so it is in safety work. If the man higher up is a safety man so is his subordinate. Successful safety work can therefore be summed up in two words: "Executive Backing," without which no line of endeavor can hope to obtain successful results.

We find that it is an easy matter to get the momentary interest and attention of the employee through safety meetings, bulletins and other means of approach, but in many cases this lasts only as long as he is being talked to. He is quite likely to return to his work and pursue

the old and unsafe methods unless properly supervised. To get necessary, continuous enthusiasm and hearty cooperation from him is well nigh impossible without the influence and support of a supervisor, who is in sympathy with and firmly believes in safety work. Working along these lines many of those companies having safety organizations are giving particular attention to the problem of the foreman, a class of employee that is difficult to reach, for by the nature of his work his energies are directed toward practical features of production, operation and service. His support is generally obtained by direct contact at meetings made up solely of foremen and supervisors, and in special classes by personal appeal in an endeavor to show him the responsibility that is his, not only for the quality of work turned out by the men under him, but for their safety by seeing that no unsafe methods or habitual infraction of rules creep into his organization and that unsafe physical conditions are corrected by safeguards and other means of protecting his men in the performance of their duties.

Lack of proper supervision enters into a majority of all recorded accidents and is the main reason why the foreman is referred to as the "Key Man" in safety work. It is only through him that the right influence can be brought to bear on the bulk of the organization. I have in mind one safety organization in a large gas company that has been functioning for about eighteen months. This organization consists of a Central Safety Committee made up of executives and heads of departments, an Executive Committee and Intermediate Committees, consisting of superintendents and plant foremen. Meetings of these Intermediate Committees are held monthly at the plants and for the most part employees are reached and influenced by these committees and the results have proved beyond a doubt that proper supervision is one of the essentials of successful safety work. A large reduction of accidents since starting the safety work on this property is the result of this method.

I was recently called upon to inspect a gas plant in one of the Northern States and I was impressed with the orderly and neat condition in which I found the plant. A gas plant at the best is no place for those who are fastidious on cleanliness, but this plant was an exception and *was* in a class by itself. I complimented the plant foreman on the excellent housekeeping conditions and asked him if he was having any accidents. His answer can be considered the keynote of safety. He said: "I believe in safety and I see that my men also believe in it." When the time arrives that all men feel as this foreman does about safety, then I believe our work will be in an ideal condition. To reach that goal, however, many obstacles have yet to be overcome. A firm belief in safety work must be implanted in the minds of men, a belief based on results obtained, a belief strengthened by the sincerity of those individuals that are engaged in the work. Only then will our purpose be accomplished.

To summarize, accident prevention work must be considered of equal importance to other activities in the business. The officials, superintendents and foremen must be taught to realize their responsibility for the safety of the men under them, a responsibility that does not cease when efficient operation and proper

(*Continued on page 281*)

Public Utilities and Reconstruction Problems

Our members will find much of interest and value in the recently published report of the Select Committee on Reconstruction and Production (United States Senate), and a request to the Government Printing Office, Washington, D. C., will bring a copy to those desiring it.

Senator Calder's committee pursued a searching inquiry into the various conditions bearing upon the housing situation and industrial production generally. Transportation—coal profiteering and supply—taxation and other matters of direct interest to the gas industry come in for a goodly share of attention—while some of the problems of the public utilities are treated in the following words.

IT has been estimated by the American Electric Railway Association, the American Gas Association, the National Electric Light Association, and by the American Telephone & Telegraph Co., that it will require approximately $700,000,000 to provide public utility service for an additional million habitations.

Prior to the war the general rule adopted by street railway companies, gas companies, and electric light and power companies was to have an extra capacity of at least 25 per cent. so as to protect service from delays incident to temporary breakdowns, but upon the outbreak of the war this rule had to be abandoned. No additional facilities could be provided owing to embargoes against expenditures for construction and owing to inability to finance improvements. The plants were taxed to their capacity to provide war-time facilities.

The public utilities emerged from the war with practically no reserve capacity, with increased demand for service, with revenue limited in amount, and the purchasing power of the dollar decreased. The resulting inferior service is directly traceable to the fact that the business of public utilities has outgrown the plants.

Prior to the war it is estimated that the normal annual requirements of electric railway, gas, and electric light and power companies for extensions, betterments, and improvements was about $500,000,000, proportioned as follows: electric railways, $250,000,00; gas companies, $125,000,000; electric light and power companies, $125,000,000.

The committee has been informed that for four years not over 40 per cent. of such betterments has been made, leaving an accumulation of about $1,200,000,000. If to this sum is added the $700,000,000 required alone for service to new residential buildings held in abeyance, a total of approximately $2,000,000,000 seems necessary for the public utility program in the immediate future.

The question of placing these businesses on a sound financial basis in order that credit may flow to them is the same question which confronts steam railroads and housing, but in the case of public utilities the situation is more difficult because there is no central body as now provided in the case of the steam railroads which might adjust rates in proper relation to operating costs and capital investment. The utilities likewise suffer in their effort to secure new capital for necessary extensions of service by the almost insurmountable difficulty of having to compete for such capital with municipal, State and similar tax-exempt securities. Until these problems are solved the public should recognize this underlying reason for much of the faulty service and for the failure to provide the additional facilities urgently demanded to meet community needs.

ACCOUNTING SECTION

W. H. PETTES, Chairman — EWALD HAASE, Vice-Chairman

H. W. HARTMAN, Secretary

MANAGING COMMITTEE — 1921

At Large

BRUNDAGE, H. M., New York, N. Y.
CONOVER, J. L., Newark, N. J.
DOERING, W. A., Boston, Mass.
FERRIS, E. J., (Mfr.) New York, N. Y.
HEINS, J. W., Philadelphia, Pa.
JAMES, F. M., Aurora, Ill.
JOHNSTON, ERNEST, Syracuse, N. Y.
McLEOD, J. E., St. Louis, Mo.
MEYERS, W. J., New York, N. Y.
SAUER, W. A., Chicago, Ill.
SCOBELL, E. C., Rochester, N. Y.
STERRETT, W. G., Chester, Pa.

Representing Affiliated Societies

ARMSTRONG, J. J., Toronto, Can. (Canadian)
CHAPIN, C. H. B., New York, N. Y. (Empire State G. & E. Assn.)
EATON, H. M., Detroit, Mich. (Michigan)
HAASE, EWALD, Milwaukee, Wis. (Wisconsin)
HOUGHTON, W. E., Los Angeles, Cal. (Pacific Coast)
HOY, CHAS. W., Glassboro, N. J. (New Jersey)
JAMES, F. M., Aurora, Ill. (Illinois)
MAYNARD, H. B., Waterloo, Iowa (Iowa)
McCABE, J. B., Dallas, Texas. (South Central)
NORTON, W. F., Nashua, N. H. (N. E. Gas Eng.)
PORTER, EDW., Philadelphia, Pa. (Pennsylvania)
SHEARON, B. P., Hammond, Ind. (Indiana)
SPENCE, GEO. H., Fayetteville, N. C. (Southern Gas)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Fire Insurance Rates—E. C. SCOBELL, Rochester, N. Y.
Job Order Systems—F. M. JAMES, Aurora, Ill.
Office Labor Saving Devices—J. L. CONOVER, Newark, N. J.
Continuous Inventory of Fixed Capital—ERNEST JOHNSTON, Syracuse, N. Y.
Standard Classification of Accounts and Form of Annual Report to Public Service Commissions—W. J. MEYERS, New York, N. Y.
State Representatives—EWALD HAASE, Milwaukee, Wis.
Uniform Accounting Nomenclature—W. A. SAUER, Chicago, Ill.

Storeroom

J. W. HEINS

The first article, to which this is a companion, was contributed by Mr. A. M. Boyd and appeared in the March issue of the MONTHLY.

IT is the intention of this paper to deal more directly with what might be termed the storeroom records and accounting.

The storeroom, its contents, receipts and issues, is covered by Mr. A. M. Boyd, of the Engineering Department.

It is particularly important that these two branches of the storeroom work be kept entirely separate and distinct.

The Engineering Department and the Commercial Department must cooperate to institute any checks that may be found necessary or expedient to insure, that an accurate record will be returned to the Commercial Office in all cases where material has been issued or returned.

The Commercial Department should be in a position to furnish information from the storeroom records at all times for the use of the Engineer, and to the end that such information be thoroughly reliable, it is essential that the storeroom records be kept up from day to day, or as near so as is practicable.

The hearty cooperation of the Engineering and Commercial Departments should also be had in furnishing the New Business Department representative with any and all information necessary to the proper guidance of this Department, insofar as storeroom stock is concerned.

The following routine is suggested for the handling of storeroom records by the Commercial Department:

Store Room Record Forms

A loose leaf record book of material received and issued should be kept, arranged somewhat after the following arbitrary divisions of storeroom, *viz.*:

Class "A"—Street Main Material.
Class "B"—Small Wrought Iron Pipe.
Class "C"—Gas Appliances.
Class "D"—Gas Fixtures and Welsbach Material.
Class "F"—Duplicate Repair Parts—Works.

In the binders the sheets in each of these classes should be kept separate and arranged in the above order, with a summary sheet for each class brought up to date monthly, showing the value balance of all material on hand at the first of each month in each class.

A single summary sheet may be kept summarizing the totals of the aforementioned class summary sheets, which will in turn show a figure comparable with the general ledger balances of storeroom.

Each of the six major classes should for convenience be divided into general divisions, such as cast iron pipe, fittings, gas ranges, water heaters, etc., with an index or guide tab for each. Any further divisions or indexing necessary could be in accordance with individual requirements.

While in general the size and shape of storeroom record sheet may be made to cover existing conditions, they should in all cases be so arranged as to contain the following information:

Supplies Received

Under this heading should be shown: date received—order number—from whom purchased—quantity—amount of invoice—freight—cartage—etc. Gross cost and unit cost—the latter carried out to four decimal places.

Supplies Issued

Under this heading should be shown: date—quantity—unit cost and total cost—together with material balance and value balance.

These issue and balance entries to be made monthly.

These sheets should be so arranged as to care for a number of invoices to make unnecessary the writing of a new sheet for each and every invoice.

The same sheet should be used until filled by either receipts or issues. A new unit should be figured for each invoice received. By that is meant, a unit value figured from the quantity on hand together with the shipment just received, and the unit value thus determined used in charging out future issues of such material until the receipt of another invoice, which would necessitate the repetition of the same operation.

It should not be necessary to re-write these sheets after inventory; rather they should be handled in the same manner as that of any other office records that are closed at the end of the fiscal year, by being ruled off, and value and material balance together with new, unit values, where necessary, brought down with "inventory and date."

The classes of the storeroom material are exceedingly diversified, and in order to reduce to a minimum the work on these records, material of comparatively small value, such as wrought iron pipe fittings in sizes up to and including 2-inch may be grouped together by sizes as fittings. In this connection it will be found there is little difference in unit cost of different kinds of fittings of the same size, and

that little, if any, error will be made in determining a single unit value for all kinds of fittings of the same size. It is, however, bad practice to group together fittings of any one kind regardless of size, as the difference in unit cost is considerable, and also as the number used of the different sizes varies considerably.

It is generally inadvisable to attempt to extend this grouping of sizes of material beyond the limits of wrought iron pipe fittings.

The information from which the invoices are to be recorded in the storeroom record book should be furnished to the Commercial Department on an appropriate printed form as the material is received in the storeroom. This form to show: kind of material—quantity received—from whom received—how received (in what condition)—whether by freight or express—if any charges were paid and amount of same—together with cartage and any other general information that might be required by the Commercial Department to promptly pass the bill for payment.

With the use of a form of this character the bill (or invoice) can be passed for payment without further reference to the storekeeper, and the information to be furnished should be of this character.

Classification Summary Sheets

The forms on which the issues from, and returns to storeroom, are reported will vary in different situations according to conditions, and as to the kind of material being reported.

These forms of various kinds will show the material used or returned, the nature of work on which it was used, location where used and the account to which the material is to be charged or credited.

The Commercial Department should make whatever checks may be deemed necessary to insure that a storeroom order is received by them for every work order which they issue. It is advisable, wherever possible, to arrange for the storeroom order to be attached to all completed work orders upon return to the Commercial Department.

If this routine is followed the failure to attach the storeroom issue to the work order will be immediately apparent to the Commercial Office.

With respect to Main and Service material, where there is frequently no order originated by the Commercial Department, an excellent check may be had monthly by comparing the total check of feet of the various size pipe laid, as shown by the records of the Street Main and Service Department with the figures obtained by the storeroom record clerk. Any discrepancies discovered can then be promptly investigated by the Engineering Department, and corrected monthly.

It has been found unnecessary to continue the use of the bound book form, known as "Summary of Credits to Storeroom," the use of which necessitated the summarizing of the individual accounts to which any material was issued, the listing of the accounts with the quantity of the material, on the storeroom record book and finally the collating from the storeroom record book of the accounts in the appropriate columns in the Summary of Credits book. The above operations required considerable time and presented always an opportunity for error. Failure of the balance of the Summary book to agree with the balance of monthly issues,

as shown by the storeroom record book, required a complete resume of the entire work.

There is no necessity for the recording of accounts to which the material is to be charged in the storeroom record book, and with this eliminated the Summary of Credits book has no purpose.

The time consumed in listing is much lessened where individual Summary Sheets for each classification are used. The size and shape of these sheets will depend somewhat upon individual preference, but one set should provide for the summary of pipe, fittings and miscellaneous articles which are chargeable to various accounts, and another set should provide for appliances—both fuel and illuminating—according to name and number, all being usually chargeable to the same general ledger accounts, for instance—gas ranges, water heaters, etc.

These sheets may be appropriately ruled and printed so as to provide sufficient space for the listing and summarizing of the maximum amount of material of that class that may be used in any one month, and in addition, providing columns for total—unit cost and total cost. One of these sheets can be used for each and every classification to which any material may be charged during the month, and a total of this sheet will represent the journal entry credit to be made to storeroom and charged to the account which the summary sheet represents. These sheets should be kept up daily by posting from the storeroom issue and credit sheets as furnished by the Engineering Department.

For convenience in posting on this summary sheet, it will be found an advantage to separate the stock sheets as received from the Engineering Department into the various classifications before entering on the Summary Sheet. In this way all of the entries for one classification may be made at one time. After recording the issue and credit sheets, they should be given a designating mark to indicate that they have been entered on the Summary Sheets. This mark should be made at the time of entry and individually, so that any interruptions in the work of summarizing will not be followed by duplicate entries.

These sheets being posted daily will not place the usual extra amount of work upon the record clerk at the close of the month. Within a week of the month's closing the unit cost column on the Summary Sheet should be filled in from the storeroom record book, and if opportunity presents, sub-totals, where large quantities of materials are used, can be made, in order to reduce to a minimum the amount of work necessary at the close of the month. When the final storeroom orders are received at the close of the month's business they can be immediately posted, the totals obtained, which when multiplied by the unit cost will supply the money value for each article. The additions of the money values on each sheet will then furnish the amount of the monthly journal entry credit to the storeroom, and charges to various ledger accounts.

From the Summary Sheets for material such as ranges, water heaters, etc., chargeable to only one account, the entry of the amount and kind of each article and appliance used can be entered directly in the storeroom record book, showing the amount of material used, but in the case of fittings or other mate-

rial that may appear charged to a number of different classifications during the month it will be necessary to summarize on an additional Summary Sheet all of the material of the same kind, regardless of classifications, in order to obtain the total amount of each kind of material used, so that only one entry for the month need be made in the storeroom record book.

Inasmuch as these figures will show both quantity and money value, the collection of this final summary will not prove a difficult or lengthy operation, as it is not necessary to make this posting to the storeroom record books until after the monthly journal entry has been entirely completed.

Since these Summary Sheets serve the purpose of the old bound book form of Summary of Credits to Storeroom, and represent the only permanent record of how the material issued has been used, it is absolutely necessary that they should be grouped together and bound in some more or less permanent form of loose-leaf binder, to be permanently filed away by years. These Summary Sheets should be printed and cut with a wide margin to the left; a binder's board cover, substantial but inexpensive, can be secured and new binder of this kind used yearly.

Experience has shown that these sheets provide a most comprehensive analysis of the material used and charged to each account, and will be a valuable reference.

Inventories

While an annual inventory of all material on hand in the storeroom is made once a year, and from which discrepancies are written off and closing entries made, it is generally impossible to properly account for either plus or minus discrepancies that may be spread over a period of from one to twelve months prior to the taking of inventory. For this reason it is deemed expedient to carry on a system of continuous inventory.

The necessity for more frequent inventory of one class of material than of another will, of course, depend upon the value of the material involved, but in general the following should serve as a guide in determining the period for sub-inventory of the various classes of material handled.

Wrought iron pipe by sizes—a different size to be checked each month throughout the year which will probably provide for two complete sub-inventories between the dates of annual inventory.

Fittings—Certain fittings of various sizes to be made monthly. This selection to be based upon the quantity of each size and kind used, the less frequently used being inventoried at least twice a year, and the more generally used from four to six times during the same period.

Other miscellaneous classes of material of small value should be inventoried as the judgment of the management dictates, following the method with reference to the fittings.

Brass Goods—The more commonly used varieties should be inventoried monthly, and all brass goods at least four times a year.

Welsbach Material—Such as mantles, cylinders, complete lamps, and the more common types of regular shades, should be inventoried monthly.

Fuel appliances of all kinds should be inventoried with sufficient frequence to keep the department concerned with their disposal, apprised of the exact stock dur-

ing the season in which they are sold in the greatest quantity. This will generally mean that inventories of some classes of appliances should be made frequently during some seasons of the year, and at other seasons a much longer time can be taken between inventories because of the fact that the stock is inactive. In general, however, inventories should be taken of this class of material within such periods as will insure discovery of any irregularities or differences between the actual stocks and book records.

To obtain the best possible results from the continuous inventory, it is suggested that some particular employee of the Commercial Office be designated to suggest each month what particular classes of storeroom stock are to be inventoried. This employee should prepare a list of such classes of material as in his judgment should be checked up; send this list to the Engineering Department which would in turn issue instructions to the storekeeper to furnish a count of the stock on hand to be inventoried, and these figures then given to the employee in the Commercial Department to be verified by the storeroom records.

The possibilities of collusion should, in this manner, be reduced to a minimum, since neither the storeroom record clerk or storekeeper need have any advance information as to what stocks are to be counted.

Miscellaneous

In the correct and accurate operation of a storeroom record it is just as necessary for the Commercial Department to receive a full and complete record of all material returned to the storeroom after having been previously issued, as it is to receive a record of the issues only. For this reason special forms must be provided by the Engineering Department on which materials to be returned to the storeroom are to be listed. These forms should preferably be of a different color from the issue return forms, and should be plainly designated "Credit." While the use of this form covers fittings and miscellaneous material satisfactorily, it is still more important that this same, or a similar form, be used in the return of an appliance that has been returned for credit.

The notification of the storeroom record clerk of the return of the appliance may be on the storeroom credit form, or the duplicate credit work order may be used for this purpose. By arranging to have all appliance credit orders pass through the storeroom record clerk before going to the sundry sales bookkeeper, a check on the storeroom record will be obtained. However, a more effectual check will be had by comparing the credit entries in the Sundry Sales blotter with the returns as shown on the storeroom Summary Sheets. This check to be made at end of each month, and need only be for name and kind of appliance. The money value entry on the Sundry Sales blotter depends upon the balance due the company as appearing in the customers' accounts on Sundry Sales Ledger, and does not represent a storeroom value, which will be determined in another manner by some constituted authority.

The operation of the storeroom system from the Commercial Office standpoint, which has been described in detail in this paper, has been found to operate satisfactorily in a number of situations where

it is now in use. Some of the details of handling may at the start prove troublesome, but as soon as the detail of operation is thoroughly understood, and complete cooperation of all the parties concerned obtained, it will be found a much more accurate and economical method of handling what has been in the past a somewhat complicated routine.

Too much stress cannot be laid upon the importance of promptly recording all of the information daily, or as nearly so as practicable. If work of this character is allowed to accumulate it will have to be taken care of in overtime, and as a consequence will be handled hurriedly, with the probability of serious errors occurring that may defeat the entire purpose of the system.

The thought should ever be in mind that any system is no better than the person operating it, and that it is just as necessary to have a competent and careful clerk employed on this work as is engaged in keeping any other of the important office records.

If the clerical experience of the man doing this work could be augmented by a certain amount of practical experience in the storeroom proper, in order that he might become familiar with the appearance and general use of the material, stock record of which he is keeping, it would be found of inestimable value.

(*Continued from page 273*)

servive are maintained, but also embraces a watchful supervision that will assure the observance of rules and the elimination of unsafe methods. It is their duty to provide such safeguards and other protective devices as may be required and to see that they are maintained in good condition and properly used. The employees should first of all be loyal to their superior and to their company and their principal duty should be to cooperate in every way with those individuals with whom they come in contact in their work.

Only by such methods can successful results in accident prevention be accomplished.

American Fire Losses For Five Years (1915 to 1919 inclusive)

The above statistics, compiled by the National Board of Fire Underwriters and classified according to causes of fires were published in the January, 1921, issue of *Safeguarding America Against Fire* and include the following of interest to gas men:

Losses from fires caused by gas, natural and artificial, for 5 years.....	$10,203,330
Losses from fires caused by gas, natural and artificial, yearly average..	$ 2,040,666
Losses from fires caused by electricity for 5-year period.....	$84,086,471
Losses from fires caused by electricity, yearly average.....	$16,817,294

Of the 22 causes of fires classified—

Gas, natural and artificial, ranked 17th in the extent of losses induced
Electricity ranked 8th in the extent of losses induced

We can improve even this record if we're careful.

Questionnaire of Committee on Fire Insurance Rates

THE Committee on Fire Insurance Rates will shortly forward to every member and non-member company in the United States a letter and form of questionnaire requesting specific data. At the time of going to press the exact form of this questionnaire had not been finally decided upon, but generally information on the following items will be sought covering the years 1916 to 1920 inclusive:

1. Value of Property at Risk.
2. Amount of Insurance Carried.
3. Total Premiums.
4. Average Rate per $100.00 Paid (Divide No. 3 by No. 2).
5. Total Losses.
6. Percentage of Losses to Premiums.
7. Losses Due to Explosion.
8. Percentage of Losses Due to Explosion.
9. Losses Due to Non-Explosion.
10. Percentage of Losses Due to Non-Explosion.

The above items refer only to gas manufacturing plants of the company and additional information will be requested as to insurance carried, premiums, losses and percentage of premiums to losses on commercial offices, storerooms and other property not subject to gas plant hazard.

It is proper to again emphasize that this information is being sought and compiled for the benefit of the industry as a whole and that such reductions as can be obtained in insurance rates will depend on the completeness with which this information is supplied.

A clause is contained in many policies covering gas manufacturing plants protecting the company against gas explosions, which are considered as fire. The underwriters in such cases want to know in taking up a rate adjustment, the losses due to explosion and those due to non-explosion and the percentage each bears to the total loss.

Recently in several underwriting jurisdictions the rating authorities have attempted to increase rates by 10 per cent. on account of the explosion clause. It is therefore important as planned in the questionnaire to show losses caused by explosion and losses from other causes separately so that complete data will be on hand to combat any increase in rates for those member companies who have an explosion clause and further to permit member companies who do not have the advantage of an explosion clause to add it to their insurance forms without the payment of additional premium. The information as received of course will be compiled in such a way as to give no indication of its source so that companies may feel perfectly free to give in full the data required.

The compiled statistics will be available to all member companies desiring to use them in securing rate reductions from their individual underwriters and the material benefit to the industry as a whole warrants the hearty support of all.

Additional copies of the questionnaire can be obtained at Association Headquarters and we trust that all of our members and particularly those whose duties bring them in contact with the insurance policy of their company will actively interest themselves in seeing that complete returns are made from their company.

The work of securing these statistics has been divided among the members of

(*Continued on page 319*)

ADVERTISING SECTION

M. C. ROBBINS, Chairman — A. A. HIGGINS, Vice-Chairman

CHARLES W. PERSON, Secretary

MANAGING COMMITTEE — 1921

At Large

CLARK, WM. J., Mt. Vernon, N. Y.
ELSMAN, RALPH, Brooklyn, N. Y.
HANLAN, JAMES P., Newark, N. J.
MULLANEY, B. J., Chicago, Ill.
MACSWEENEY, JOSEPH P., Rochester, N. Y.
PETTENGILL, ANDREW F., JR., Cambridge, Mass.
WAGNER, F. H., Baltimore, Md.
WARNER, GEO. H., New York, N. Y.
WELSH, WILLIAM J., Stapleton, N. Y.

Representing Affiliated Societies

ALLEN, GEO. W., Toronto, Can. (Canadian)
CARRAWAY, LEAKE, Norfolk, Va. (Southern)
CHAPIN, C. H. B., New York, N. Y. (Empire State Gas & Electric Association)
FRANKLIN, S. J., Millville, N. J. (New Jersey)
FUGATE, FRANK, Detroit, Mich. (Michigan)
GOULD, WM., Boston, Mass. (N. E. Gas Eng.)
HARTOG, JOHN H., Portland, Ore. (Pacific Coast)
JASPERSON, R. O., Chicago, Ill. (Wisconsin)
LESTER, F. M., Chicago, Ill. (Illinois)
MARTIN, E. H., Des Moines, Ia. (Iowa District)
MULHOLLAND, S. E., Fort Wayne, Ind. (Indiana)
ROLSTON, R. J., Philadelphia, Pa. (Pennsylvania)

What Do You Do With Your Complaints?

ONE striking fact to be learned from a study of complaints registered at the average gas company office is their uniform character. This is a very fortunate condition from the standpoint of public relations work and one that is envied by other business organizations in various lines of commercial enterprise that are frequently obliged to spend large advertising appropriations in stopping so-called "whispering campaigns" and in ferreting out the source of complaints and the causes contributing to them.

"Whispering campaigns" are practically non-existent in the gas business principally because of the close personal contact possible between the company and its customers, which condition encourages an expression of opinion, favorable or otherwise, and keeps the company executives constantly advised, at a very small cost, of the character of complaints.

That these complaints are about the same the county over, is the conclusion which may be drawn as the result of a questionnaire recently sent to a list of company members of the Association by this Section. From a careful study of the replies made, we are able to give below what we believe to be the four most numerous complaints registered by customers at the average gas company office. They are:

High bills involving the accuracy of the meter.
Gas is poor or has no heat in it. Company pumps air in its gas.
Company making enormous profits.
Employees are discourteous.

It is not necessary to go into the justice or injustice of these complaints, or to explain the most effective ways of correcting them, for these are matters for local action. But the fact that certain complaints are more prevalent than others, such as those already mentioned, should lead gas companies to put forth every effort in their public relations work to correct them and not to turn off at a tangent and by so doing neglect the fundamentals.

Our Advertising Service

WE have included the first twelve of our good-will advertisements in a booklet which has been issued to our member companies. We have a small supply still on hand and will gladly send a copy to anyone interested in this feature of the Association's work.

Advertisement No. 13, which is the first of the second series of twelve advertisements we are now working on, is reproduced in this section. Unfortunately it is shown in a size which does not do justice to it and we will shortly issue proofs of it in the large four-column size, wich will show the art work off to advantage.

Our member companies who have given us such splendid support on the first series are urged to send in their subscription to Advertisements 13 to 24 inclusive, which constitute a full year's service, one advertisement being issued each month. We have mailed order blanks for this purpose and the response already made shows that the service is growing steadily and is becoming increasingly useful to the industry.

The advertisements to be issued in the future will deal very largely with service problems facing the industry, with special emphasis put on the human element. There will be one or two additional advertisements on the gas meter. This subject is such an important one from the public relations standpoint that no series of good-will advertisements would be complete without touching upon the meter's reputation for accuracy and the desire of the company to have its customers read their meters. Other advertisements in the series will deal with consumer complaints and other vital issues.

Our practice of preparing and issuing one advertisement each month instead of working up the whole series in advance, will be followed in the future as it has in the past in order to make the series as timely as possible. Special care will be taken in the preparation of the advertisements to make them applicable to local conditions encountered in the average city or town and the gas business will be emphasized rather than the public utility business.

The service will be supplemented later by a series of twelve, inexpensive, one-column advertisements which will take up service problems and questions in a personal and friendly way that will appeal to the consumer. This kind of advertising has been used with success in the middle West. We shall endeavor to make our little advertisements assume the importance of personal talks with the manager and thereby create a closer understanding between the company and its customers. Proofs of these advertisements, together with full instructions as to their use, will be issued in the near future.

Good News

An original printing of 100,000 copies of the illustrated booklet entitled "Truths About the Meter" is already exhausted at this writing. Have you sent us your order?

Two Advertisements in One

THE Atlantic City Gas Company recently published a full-page advertisement in its local papers which was a novel combination of the commercial and the public relations sides of the business. The advertisement was illustrated with nine different appliances and the text dealt with the various service facilities of the company, with the heading "Gas, the Leading Factor in Civic Development" at the top of the page.

After a brief mention of the gas business in Atlantic City, the advertisement took up the subject of service in this manner:

"It is our aim to see that all our customers are getting the very best of service and if you are not receiving it, we would be glad to have you communicate direct with our Commercial Department and an investigation will be made, for we feel sure that if all gas matters are brought directly to our attention we will be able to eliminate 99 per cent. of your gas worries and at the same time it enables us to get in closer touch with you, as it is our earnest desire to meet all our customers. We wish you to feel that this is your institution to come and go as you please. Courteous attendants will gladly answer any questions pertaining to gas matters, none of which are too small or too large."

Further down in the advertisement appeared the heading: "The Gas Company is Part of the Community. We Carry Our Full Share of the Growing Cost of Atlantic City." The text under this significant statement was as follows:

"The Gas Company is taxed like any other business enterprise and carries a good-sized pay roll which helps make growth and development of the city as a whole. Imagine Atlantic City without a Gas Company (impossible). There would not be any city. Take for example like towns where the outlying districts are not covered by gas mains. You will find little or no development, which proves in itself that a Gas Company is an asset to any city or town, as well as the community at large. Syndicated organizations have the natural facilities for developing and specializing talent, which seems to be impossible to an independent concern, and can secure and afford the best brains in the business; can discover the best methods and processes of merchandising and have facilities for comparative accounting and detail. The Gas Company asks cooperation. With it service and efficiency can be readily given. Let us all pull together. You need a Gas Company—we need you. Come in and get acquainted. If you cannot call, communicate by phone or correspondence and we will come to you. Our one honest and sincere aim is to gain your cooperation, which will establish confidence, and we are ready to serve you twenty-four hours each day."

School Children Visit Plants

Reports from newspapers in the middle west indicate that many of the utility managers are inviting school classes, clubs, etc., to visit their plants on inspection tours. One manager states that the Mayor of his town accompanied three high school classes on three consecutive afternoons.

Horace M. Davis, director of the Nebraska Committee on Public Utility Information, in commenting on the above says:

"It is great business. It may not show immediate results, but you are building public relations sentiment for the future."

THE A. G. A. GOOD-WILL ADVERTISING SERVICE

Advertisement No. 13

Behind the Scenes

STARTING with the coal mines and oil wells at the bottom and working up to the consumer at the top, you see the two great manufacturing processes employed in the gas business. On the left is the coal gas process; on the right, the water gas process.

Step by step, the coal and oil are transformed from raw material into an invisible fuel, clean and efficient, that is piped into your home, ready for use at the turn of a valve.

Here is shown the costly machinery which composes the live, throbbing system that renders gas service instantaneous and dependable.

And back of it all are the men who toil and sweat and become grimy that you, our customers, may have this essential fuel on tap with no trouble at all.

How very human it all is when you see it from behind the scenes!

(Insert name of your Company here)

MEMBER OF THE AMERICAN GAS ASSOCIATION

This advertisement is issued in two sizes, three and four-column newspaper width. The art design is good for a number of impressions. You may change the text if you desire.

PRICES.

	3-colum matrix	4-colum matrix	3-colum electrro
Single advertisement	$ 3.00	$ 3.00	$ 4.00
Twelve advertisements (Nos. 13 to 24).....	$36.00	$36.00	$48.00

COMMERCIAL SECTION

H. S. SCHUTT, Chairman — LOUIS STOTZ, Secretary — A. P. POST, Vice-Chairman

MANAGING COMMITTEE — 1921

At Large

ABBOTT, M. E., Taunton, Mass.
BARNES, CYRUS, Boston, Mass.
BARNITZ, F. R., New York, N. Y.
BARTHOLD, WM. H., New York, N. Y.
BENNITT, GEO. E., New York, N. Y.
DAVIES, J. E., Chicago, Ill.
GASTON, LUTHER, Lebanon, Pa.
GOULD, WM., Boston, Mass.
HEWITT, ARTHUR, Toronto; Ont., Can.
JELLIFFE, C. N., New York, N. Y.
KAHN, A. M., Hamilton, Ohio
LEARNED, J. G., Chicago, Ill.
LEMKE, FRANK, Kalamazoo, Mich.
LOEBELL, HENRY O., New York, N. Y.
LONG, H. J., New Brunswick, N. J.
MYERS, J. B., Philadelphia, Pa.
POST, A. P., Philadelphia, Pa.
RUTLEDGE, F. J., Philadelphia, Pa.
SCHUTT, H. S., Philadelphia, Pa.
SHERWOOD, J. M., New York, N. Y.
SMITH, CHAS. S., Philadelphia, Pa.
STEPHANY, E. J., Pittsburgh, Pa.
YOUNG, R. R., Newark, N. J.

Representing Affiliated Societies

BORDEN, A. W., Hastings, Neb. (Iowa Dist.)
BURKE, E. J., Indianapolis, Ind. (Indiana)
CHAMBERLAIN, G. R., Grand Rapids, Mich. (Mich.)
CHAPIN, C. H. B., New York, N. Y. (Empire State)
CLARK, H. H., Chicago, Ill. (Illinois)
CRAFTS, H. C., Pittsfield, Mass. (N. E. Gas Eng.)
CRANKSHAW, J. WARD, Allentown, Pa. (Pennsylvania)
FLAUTT, J. J., New Orleans, La. (South Central)
HANLAN, J. P., Newark, N. J. (New Jersey)
JOHNSON, W. B., Toronto, Ont. (Canadian)
McARDLE, JAS., Macon, Ga. (Southern)
ST. JOHN, JOHN, Madison, Wis. (Wisconsin)
WEISS, FRANK, Los Angeles, Cal. (Pacific Coast)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Gas Lighting—F. R. BARNITZ, New York, N. Y.
Heating—GEO. E. BENNITT, New York, N. Y.
Industrial Fuel Sales—HENRY O. LOEBELL, New York, N. Y.
Industrial Fuel Contracts (Sub.) — CHAS. S. SMITH Philadelphia, Pa.
Customer Service—J. B. Myers, Philadelphia, Pa.
Merchandising—H. J. LONG, New Brunswick, N. J.

Window Displays

A glance at the stores of the most successful merchants in your city will show you that they are getting much of their business by making attractive, attention-compelling displays of the goods they have for sale. The special effort they make to attract customers in this way is largely responsible for the results they obtain.

We propose to make a portfolio collection of the best gas company window displays, reproducing these in pamphlet form, grouping the displays as to type of appliances, service ideas, holiday and seasonal suggestions.

Such a collection of displays will place before the window trimmer a variety of suggestions which would be of help to him in planning the layout of his own windows.

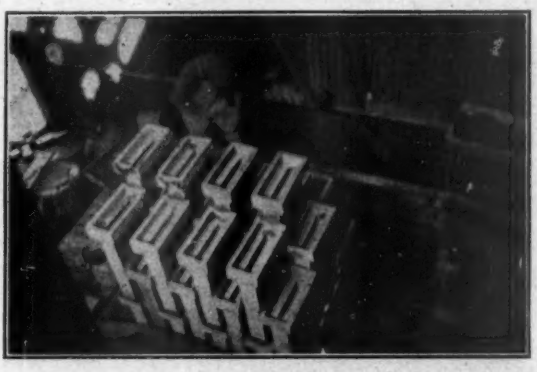
The gas industry might profitably observe and follow the methods of the successful merchants in other lines and in this connection attractive window displays are a most important consideration and should be given more attention.

Our members are asked to aid in this service by supplying to Association headquarters photographs or sketches of their best window or show room ideas. Look over your collection of photographs at once and send us the best displays you have used in the past.

Recuperators and Regenerators

HENRY O. LOEBELL.
The Fourth of a Series of Articles by Henry L. Doherty & Co's Industrial Heating Dept.

IN the zinc smelting industry the cost of fuel is a large proportion of the total operating cost, and as fuels of all kinds have steadily increased in price it has been necessary for many smelters to move their plants to places where cheaper fuel was available or to develop more economical methods of using the fuel at hand.



Looking down on top of recuperator tile. Shows air ducts.

Many of these smelters are located in the Southwest near the zinc ore mines, in places where natural gas is available. Natural gas makes an ideal fuel for these plants, but as the price of gas gradually advanced they sought means of obtaining better fuel economy, so that the fuel cost per ton of product would not increase.

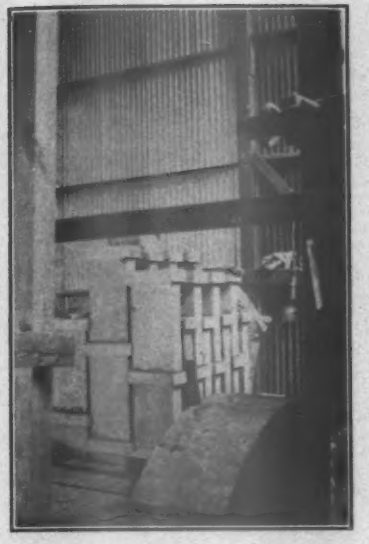
This article will describe the design, construction and results obtained with a tile recuperator on an experimental zinc smelting furnace, in the sourthern part of Kansas.

The furnace proper consisted of a zinc oxide reducing furnace containing 56 retorts. These were placed in vertical rows four feet high and two of such rows between each pair of buck-stays, making what is known as seven half-sections.

Provisions were made for admitting both air and gas through ports along the buck-stays at the right side of each half section. The back wall of the furnace was an 18-inch fire brick wall with ledges on the inside spaced at proper distance to support the back end of the retorts. The front wall was constructed similar to modern practice in zinc blocks. The recuperator was placed at the end of the furnace and took the place of the stack.

This recuperator was constructed of hollow tiles so arranged that the air passed downward through the tiles and the flue gases passed upward, in a zig-zag path around the tile, thus giving up the heat to the air.

The following assumptions were made in designing a recuperator suitable for this experimental furnace:



Shows how recuperator tile were assembled. The flue gas inlet from the furnace is under the arch.

In this and the following illustration note how hubs of tile make contact with adjacent tile so the flue gases must take a zig zag course.

Flue gases enter at 2000° F. and leave at 500° F.

Cold air enters at 60° F. and leaves at 1800° F.

Sufficient air to be heated to burn 3000 cubic feet of natural gas per hour, with 10 per cent. over-ventilation.

Average velocity of flue gases and air to be 16.5 feet per second.

Using the above figures the final dimensions of the recuperator when using 32 columns of bell and spigot fire clay tile 1 inch thick, with an inside opening 1 inch by 10 inches, would be:

Wooden model of recuperator tile assembled

Area of heating surface.....	1710 sq. ft.
Area of air passage.....	2.22 sq. ft.
Area of flue-gas passage....	6.9 sq. ft.
Outside dimensions of stock	7.5 ft. x 8.25 ft.
Total height	33 ft.

The accompanying photos show how the stack and recuperator was assembled.

In assembling the recuperator odd lengths of tile were used at the bottom so that the hubs of the tile would cause the flue gases to take a zig-zag path in working upward through the stack. These tile were so designed that the hubs of each tile made a close fit with the body of all the adjacent tiles—so that the flue gases could not short circuit and pass directly upward around the tile.

The heated air was collected in large hollow tiles at the bottom of the recuperator and led through a duct and distributed to each burner.

A cast iron box was used at the top of the recuperator to distribute the cold air into the 32 columns of hollow tiles.

The furnace had to be heated very gradually and in doing this it was found that there was a large amount of air eakage from the inside of the tile to the flue-gas passage. It was later found that most of this leakage was directly through the pores of the tile and in any future work of this kind it would be advisable to have the tile glazed both inside and out. Some leakage occurred in the joints where the hubs and bells were joined, but this could be avoided by using a fusing cement in making up these joints. Because of this air leakage we were not able to preheat the air to more than 800° F. and of course did not realize the theoretical efficiency for which we had hoped.

In spite of this handicap the results, over a period of several months, showed an average gas consumption of 40,150 cubic feet of gas per day, when using the recuperator and 55,480 cubic feet per day when using cold air. This signifies a saving of 27.7 per cent. of the gas used on a cold air basis.

From the results obtained on this experiment it would seem quite possible to design a tile recuperator which would show a saving of 35 per cent. to 40 per cent. in the fuel used, when applied to a standard zinc smelting block.

Time Required to Install Gas Appliances and Piping

In the *Domestic Engineering Magazine*, issue of December 18, 1920, there appears the first series of an interesting article by Mr. G. A. Drury entitled "Time Required to Install Gas Appliances and Piping."

The author gives quite a number of tables setting forth the average number of fittings and the average length of time required to connect various domestic gas appliances such as kitchen ranges with gas piping and flue connections, and also kitchen ranges where gas piping is already in place.

In addition there are tables for connecting room heaters, laundry stoves, hot plates, water heaters, incinerators and gas grates and logs. There are also tables covering house piping with one, two and three outlets.

The author states that the information was collected from an analysis of approximately 2,500 time sheets.

The tables are not presented for the purpose of showing exactly how fast a man should or should not work, but merely an analysis of what has been done during a period extending over two years.

In contemplating the factors influencing the time required to do various house piping jobs, the author speaks of four factors which stand out as predominate.

1. Character of the house; its size; whether brick or frame; whether just being built or whether an old house to be piped; nature of floors.
2. Whether the piping is to be exposed or concealed.
3. The total length of pipe to be installed.
4. Nature of the piping, whether simple or complex; *i. e.*, whether many fittings are necessary to make the various bends to direct the pipe to its desired location.

Publicity by Means of Trade Papers

IN line with our policy to give the widest publicity to the merits of gas as an industrial fuel, plans are under way and have to some extent been consummated in which this subject will be brought to the attention of the various trades through the journals having the widest circulation among their respective interests.

The following have appeared recently:

"Conserving Coal Through the Use of Gas" by W. A. Ehlers.
Coal Age, March 3, 1921.

"The Application of Gas to Forging" by The Industrial Heating Department of H. L. Doherty & Company.
Iron Age, March, 1921.

"The Application of Gas to Varnish Boiling" by Paul Dorchester.
Bulletin, March, 1921, National Paint, Oil and Varnish Association.

The following have been accepted for publication and will appear shortly:

"The Application of Gas to Brass Melting" by A. L. Palmer.
The Foundry.
The Brass World.
The Metal Industry.

"The Application of Gas to Core Drying" by A. A. Schutz.
The Foundry.

"The Application of Gas to Varnish Boiling" by Paul Dorchester.
The National Varnish Manufacturers Association *Bulletin.*
The Paint Manufacturers Association *Bulletin.*

"The Application of Gas to Coffee Roasting" by W. A. Ehlers.
The National Retail Tea and Coffee Merchants Association, *The Teacup.*

"The Application of Gas to Japanning" by Hampton Jones.
The Metal Industry.

"The Application of Gas to the Singeing of Cotton Piece Goods and Yarns" by W. A. Ehlers.
Textiles Journal.

"Melting Glass with Atmospheric Burners" by J. E. Bullard, reprinted from *The Gas Age.*
Crockery and Glass Journal.

The printing of other papers is being arranged, announcement of which will be made later.

Modern Automobile Spring Manufacturing

The above caption is the title of a very interesting article which appears in *The Iron Age*, issue of January 6, 1921, describing the methods and equipment employed by the Detroit Steel Products Company.

This should be of particular interest to industrial fuel engineers and salesmen because the heating of the spring stock for forming and the tempering processes is furnished by gas.

MANUFACTURERS SECTION

GEO. S. BARROWS, Chairman — JOHN S. DeHART, Jr., Vice-Chairman

W. W. BARNES, Secretary

MANAGING COMMITTEE — 1921

At Large

BARNES, W. W., New York, N. Y.
BARROWS, GEORGE S., Providence, R. I.
BRUCE, HOWARD, Baltimore, Md.
CONROY, J. P., New York, N. Y.
CRANE, WM. M., New York, N. Y.
DEHART, JR., J. S., Newark, N. J.
GRIBBEL, W. GRIFFIN, Philadelphia, Pa.
KOPFER, W. B., Brooklyn, N. Y.
KNAPP, F. H., Pittsburgh, Pa.
LEMKE, F. A., Kalamazoo, Mich.
LOHMEYER, H. B., New York, N. Y.
LONG, H. J., New Brunswick, N. J.
McDONALD, DONALD, New York, N. Y.
MUELLER, ROBERT, Decatur, Ill.
NORTON, H. A., Boston, Mass.
ROPER, GEORGE D., Rockford, Ill.
SHERWOOD, J. M., New York, N. Y.
STITES, TOWNSEND, Gloucester, N. J.

Representing Affiliated Societies

BABCOCK, C. B., San Francisco, Calif. (Pacific Coast)
BARTLETT, C. E., Philadelphia, Pa. (Pennsylvania)
BREWER, E. D., Atlanta, Ga. (Southern)
CHAPIN, C. H. B., New York, N. Y. (Empire State)
ECCLES, GEO. W., Waltham, Mass. (N. E. Gas Eng.)
GIBSON, W. R., Toronto, Can. (Canadian)
LONG, H. J., New Brunswick, N. J. (New Jersey)
McCULLOUGH, CHAS., Milwaukee, Wis. (Wisconsin)
MILLER, THOS. D., Detroit, Mich. (Illinois)
SEIDENGLANZ, C. H., Dallas, Tex. (So. Central)
SCHALL, H. D., Detroit, Mich. (Michigan)
WARREN, W. M., St. Louis, Mo. (Iowa Dist.)
WESTON, J. A., Lansing, Mich. (Indiana)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Membership—GEORGE W. PARKER, St. Louis, Mo.
Apparatus Makers—D. J. COLLINS, Philadelphia, Pa.
Nomination—
Exhibition—W. W. BARNES, *ex-officio*, New York, N. Y.
Illustrated Lectures—GEORGE S. BARROWS.
Division of Meter Manufacturers—DONALD MCDONALD, Chairman, W. P. HUTCHINSON, Vice-Chairman
Division of Gas Range Manufacturers—WM. M. CRANE, Chairman, I. W. PEFFLY, Vice-Chairman.
Division of Water Heater Manufacturers—H. J. LONG, Chairman
Divison of Office Labor Saving Devices Manufacturers—H. B. LOHMEYER, Chairman, E. J. FERRIS, Vice-Chairman
Division of Heating Appliance Manufacturers—J. P. CONROY, Chairman
Division of Industrial Appliance Manufacturers—WM. B. KOPFER, Chairman
Division of Lighting Appliance Manufacturers—TOWNSEND STITES, Chairman
Division of Apparatus & Works Manufacturers—J. S. DEHART, JR., Chairman
Division of Supply Manufacturers—R. MUELLER, Temporary Chairman
Division of Accessories Manufacturers—J. M. SHERWOOD, Temporary Chairman

Our prosperity is dependent upon the prosperity of those producing the gas utilized by our appliances—our interests are in common.

Manufacturers!

THIS new membership campaign in which the Association is asking you to assist is the biggest opportunity you have yet had to do the A. G. A. a worthwhile service. It started in some such manner:—The Secretary-Manager, in a letter to Mr. Barrows, spoke of the value that would result to the industry as a whole were all the gas companies in the United States, united in one great organization, such as the A. G. A. represents,—an organization dedicated to the company interests and company needs of the gas business. A plan was presented whereby the manufacturers could do a great share in bringing this about.

Following is an excerpt from Mr. Barrows' letter which went out to every manufacturer member:

"A list of non-member gas companies has been prepared. One of these lists is sent you under separate cover with the request that you indicate thereon those companies which you or your traveling representatives through close personal acquaintance may influence in the matter of membership. If you will do this by placing check marks opposite the names of the companies and return the list to Mr. P. H. Hall, Assistant Secretary-Manager, American Gas Association, 130 East 15th St., New York, there will be forwarded promptly to you a prospect card for each company you have indicated, together with literature and application blanks to be used in the membership effort. The prospect card will give whatever data is available for failure thus far to bring that particular company into membership, while the literature will consist of a four-page folder with a detachable application blank, which will concisely enumerate the principle and most valuable activities of the Association, reasons why every gas company in the country should be a member of it and information as to dues and other requirements of membership."

The literature of which he writes was chosen to convey an idea of perhaps one phase of the service the A. G. A. renders. The service as a whole was covered by Mr. Fogg's letter, also furnished with the other matter for the non-member and which, insofar as words may, tells the story of the outsiders' need for us and of our need for them most convincingly.

Every interested member must realize just how important it is that these outsiders, who in the main are small companies, be brought within our enrollment. It is not a question of revenue to us; it is a question of *union*. Before this industry will have attained its greatest strength it must learn the need of standing together.

—o—O—o—

A Statement of Principles

PAUL M. WARBURG, American Acceptance Council, 111 Broadway, New York City.

WE are preaching the gospel of the trade acceptance for no other purpose than that we believe its use makes for sounder business and banking conditions. We do not say that single name paper is not good, or illiquid; but we may fairly say that the trade acceptance is better and more liquid. We do not say that the trade acceptance serves all purposes and that all cash sales and all cash discounts ought to be avoided; but we do say that where business is not done on a strictly cash basis, the trade acceptance will be found the safer, sounder, and, in the long run, more economical method than the open accounts. Indeed we believe that it is so much of an improvement over the open account that in some cases sellers, at present sacrificing a very heavy cash discount for the purpose of avoiding the dangers and inconveniences of open accounts, might find it to their advantage to consider the economy involved in the use of the trade acceptance when dealing with customers of strong credit. The American Acceptance Council's interest in the matter in whatever makes for better morals in business and for better credit and banking conditions is a decided benefit to the United States.

American Gas Association

130 EAST 15th ST., NEW YORK. N. Y.

Working Together

Cover of four page folder used in Campaign.
(see pages following)

What You Get —

The General Service of the Association—in which is provided expert engineers to aid in the development of your industrial fuel business—to assist in the preparation of your rate cases—adjustments of quality and service standards, plant operation and engineering problems. A service *you* get at cost—not profit—from the Association.

An organized staff and representative committees to respond promptly to *your* requests for information and assistance.

Technical and engineering development in such important investigations as The Gas Oil Situation; Complete Gasification of Coal; Expansion of Distribution Systems; Gas Pipe and Meter Deposits; Gas Coal Specifications; Purification; Electrolysis, Insurance Reduction Inventories, etc.

Information Service Letters, giving *you* prompt information of national legislation, important decisions of the commissions and courts and other matters of first concern to *your* business.

Records of 1,500 rate increases recently granted to 900 gas companies; General Statistics of the industry of the greatest necessity to *you* in presenting *your* case on rate changes, franchises or standards of every description before your city council or state commission.

Constructive Publicity—Goodwill Advertising Service (now used by over 150 companies); Press Publicity and News Articles; Illustrated Folders for Consumers; assistance in preparation of *your* advertising and publicity campaigns or copy.

Annual Proceedings, practically a reference library, covering the important happenings, developments and progress of the industry year by year.

The Association's MONTHLY—Up-to-Date Information that gas men must have, covering, besides such subjects as are indicated in paragraph three, Merchandising Methods, Service Methods, and current gas news concerning the entire industry.

The annual Conventions and the National Exhibitions of gas appliances and apparatus.

Your Participation through A. G. A. representation in the activities of other national bodies such as Chambers of Commerce, Congressional and Legislative Commissions, Bureau of Standards, Coal and Oil Boards, whose decisions are of vital importance to you.

AND MOST IMPORTANT OF ALL

The strength of a united industry. Its combined influence for the development and improvement of the gas business; the creation of good will and the safeguarding of its rights and interests.

What You Give

"This Appeals to Me—Here's My Check You Can Count on Our Interest and Support"

Tear off this blank, sign it, and send it now

APPLICATION FOR COMPANY MEMBERSHIP
AMERICAN GAS ASSOCIATION
130 East 15th St., New York, N. Y.

.....19....

The undersigned on behalf of his company submits this application for Company Membership in the AMERICAN GAS ASSOCIATION, and agrees, if elected, to comply with the requirements of the Constitution and By-Laws.

CONSTITUTION—Article IX—Dues.

1. **Gas Companies**—$25.00 per year plus 1/30 of 1 per cent. of the annual gross sales of gas during the previous calendar or fiscal year.

2. **Manufacturer Companies**—[Gas appliances or apparatus]

Class A—Under $50,000 gross annual revenue derived from the gas business during the previous calendar or fiscal year—per year $25.00 plus $20.00

Class B—From $50,000 to $250,000 gross annual revenue derived from the gas business during the previous calendar or fiscal year—per year $25.00 plus $90.00

Class C—From $250,000 to $750,000 gross annual revenue derived from the gas business during the previous calendar or fiscal year—per year $25.00 plus $190.00

Class D—From $750,000 to $1,500,000 gross annual revenue derived from the gas business during the previous calendar or fiscal year—per year $25.00 plus $290.00

Class E—Over $1,500,000 gross annual revenue derived from the gas business during the previous calendar or fiscal year—per year $25.00 plus $490.00

3. **Holding (Managing or Operating) Companies**—$100.00 per annum, provided all of their subsidiary gas companies are company members.

Company .....
Street Address .....
City .....State .....
Signed by.....Official Position.....
Class of Membership.....

Endorsed by .....
Endorsed by .....

Every application for company membership shall be endorsed by two members of the class in which applicant desires membership.
Fiscal year ends Sept. 30, 1921. Companies joining now pay dues for half year.

Section Notes

PLANS for the exhibition to be held in conjunction with the annual convention of this Association at the Congress Hotel in Chicago, November 7 to 12, are about completed. A prospectus with floor plan will be mailed to all manufacturer company members. The location of the exhibition will be in the Elizabethan Room, first floor, where gas will be supplied to a limited number of exhibitors, and the Florentine Hall and adjoining rooms on the second floor of the hotel where all dead exhibits will be shown.

Provision will be made for 110 exhibitors with a floor space of some 9,500 square feet. While the spaces will in a way be smaller than those of the 1920 Exhibition at the Hotel Pennsylvania, New York City, the Exhibition Committee feels that sufficient space will be available to do justice to all exhibitors.

Early predictions indicate that the 1921 Exhibition will be as successful as all former ones and while the exhibition in its entirety will not be as compact as others, the division of the exhibit in two sections will obviate the crowding of the exhibition space which was experienced in the past.

The illustrated lecture showing views of the 1920 Exhibition of Appliances, etc., held at the Hotel Pennsylvania, New York City, which was to be presented before state and district gas associations at their meetings this year, has been postponed by the Managing Committee of the Section due to the delay in its preparation. This is due to the fact that exhibitors did not place in the hands of the secretary of the section, the photographs of the special feature of their exhibit which was to be used in conjunction with the photographs of the entire exhibit in illustrating this lecture. It is to be regretted that this interesting lecture could not be prepared in time for the meetings of the various state and district gas associations as it was thought it would be of great interest to the managers of the smaller gas companies who could not attend the 1920 Exhibition of the A. G. A.

Another effort will be made after the Chicago exhibit to prepare an illustrated lecture of the 1921 Exhibition and it is the hope of the Managing Committee that exhibitors will be more responsive in furnishing the material to permit of its preparation.

The Membership Committee under the Chairmanship of George W. Parker is making an extensive campaign to increase the company membership of this Association. We are pleased to welcome the following companies who have been interested through the Committee's efforts:

Michigan Ammonia Works, Detroit, Mich.
American Gas Construction Co., Newton, Iowa.
Connersville Blower Co., Connersville, Ind.
B. F. Sturtevant Co., Boston, Mass.

Six months of the fiscal year have expired, and by resolution of the Executive Board all companies taking membership in the Association after April 1, except those who contemplate exhibiting at the coming exhibition, will have one-half year's dues rebated; new members exhibiting will pay the full year's dues in order to qualify as exhibitors with all others.

TECHNICAL SECTION

R. B. HARPER, Chairman — H. R. COOK, Jr., Vice-Chairman

H. W. HARTMAN, Secretary

MANAGING COMMITTEE — 1921

At Large

CHUBB, C. N., Davenport, Iowa
CLARK, JOHN A., JR., Newark, N. J.
FIELDNER, A. C., Pittsburgh, Pa.
FORSTALL, WALTON, Philadelphia, Pa.
FULWEILER, W. H., Philadelphia, Pa.
LUNN, C. A., New York, N. Y.
MACBETH, G. T., Mt. Vernon, N. Y.
MEYERHERM, C. F., New York, N. Y.
MORHOUS, O. A., Astoria, N. Y.
NORMAN, O. E., Chicago, Ill.
SPERR, F. W., Pittsburgh, Pa.
TAUSSIG, J. H., Philadelphia, Pa.
TUTWILER, C. C., West Conshohocken, Pa.
VINCENT, G. I., Syracuse, N. Y.
WARNER, A. W., Chester, Pa.
WEBER, F. C., New York, N. Y.
WHITE, PROF. A. H., Ann Arbor, Mich.
WILLIEN, L. J., Boston, Mass.

Representing Affiliated Societies

AUSTIN, E. E., Sumter, S. C. (Southern Gas)
BROWN, J. A., Jackson, Mich. (Michigan)
CHAPIN, C. H. B., New York, N. Y. (Empire State G. & E.)
CHUBB, C. N., Davenport, Ia. (Iowa)
CORNISH, R. C., Philadelphia, Pa. (Pennsylvania)
HART, J. G., Waukegan, Ill. (Illinois)
HUMPHREYS, J. J., Montreal, Canada. (Canadian)
JONES, JACOB B., Bridgeton, N. J. (New Jersey)
LYONS, B. F., Beloit, Wis. (Wisconsin)
NEAL, GEO. A., Hammond, Ind. (Indiana)
PAIGE, C. E., Worcester, Mass. (N. E. Gas Eng.)
PAPST, H. M., Portland, Ore. (Pacific Coast Gas)
SEDBERRY, W. H., Marshall, Tex. (South Central)

CHAIRMAN OF SECTION COMMITTEES ORGANIZED TO DATE

Carbonization—J. H. TAUSSIG, Philadelphia, Pa.
Cast Iron Pipe Standards—WALTON FORSTALL, Philadelphia, Pa.
Chemical—C. A. LUNN, New York. N. Y.
Complete Gasification of Coal—A. W. WARNER, Chester, Pa.
Consumers Meters—JOHN A. CLARK, JR., New York, N. Y.
Disposal of Waste from Gas Plants—F. W. SPERR, Pittsburgh, Pa.
Electrolysis—CHAS. F. MEYERHERM, New York, N. Y.
Gas Coal Specifications—PROF. A. H. WHITE, Ann Arbor, Mich.
Gas Oil—W. H. FULWEILER, Philadelphia, Pa.
Increasing Distribution Capacity—C. N. CHUBB, Davenport, Ia.
Refractory Materials—W. H. FULWEILER, Philadelphia, Pa.
Gas Pipe and Meter Deposits—O. A. MORHOUS Astoria, N. Y.
Nomenclature—O. E. NORMAN, Chicago, Ill.
Purification—A. C. FIELDNER, Pittsburgh, Pa.

Executive Committee Completes Program

AT the second meeting of this Section's Executive Committee, in Chicago, March 16, progress of committees appointed to date was reported and a more concise and definite outline of the work to be accomplished by each committee decided upon. This program is designed to comply with the activities suggested for the Section by our members and further comment is solicited on the outline submitted herewith.

PRODUCTION DIVISION

Carbonization Committee

(1) A study and report of recent developments in all types of carbonization equipment and methods of operation.

(2) The gathering together and reporting of statistics on the comparative efficiencies of different types of coal gas plants and mixed coal and water gas plants.

Committee on Complete Gasification of Coal

(1) A study and report of the estimated total heating values, compositions, specific gravities, costs in holder, etc., of the gas produced by the complete gasification of various high and low grade coals in various types of plants.

(2) Collection and study of operating results, cost data, etc., of existing

straight blue water gas and low temperature carbonizing plants and of plants in which the charges are steamed or other methods are employed for the production of lower heating value gases than are usually made elsewhere.

(3) A study and report of the estimated cost of gas in the holder for gases of various total heating values, including those most economically produced, in each of different types of plants under various conditions.

(4) An estimation and report, based upon the foregoing studies and work, of the general qualities, namely, the compositions, total heating values, specific gravities, etc., of gases which might be most economically produced in various types of plants under average conditions.

Committee on Disposal of Waste from Gas Plants

(1) A study of new methods in the disposal of wastes from coal gas plants with particular reference to the wastes from ammonia plants.

(2) Action as an advisory committee on all questions or matters of the disposal of wastes from gas plants which may be referred to the Committee.

Gas Oil Committee

(1) A study of new data and report of same concerning the available supply of crude oils in the United States and Mexico.

(2) A study and report of the various qualities of oils available for gas making purposes.

(3) A study and report of the use of heavy oils and their effects upon the capacities and efficiencies of the present types of carburetted water gas apparatus.

Refractory Materials Committee

(1) General study and report of the values of various refractory materials, such as carbofrax, chromite, magnesite, superfrax, zirconite, mica schist and silicon carbide, for use as linings in water gas generators.

(2) Cooperative work on refractories with Committee C-8 of the American Society for Testing Materials and the Refractory Committee of the Refractory Manufacturers Association.

DISTRIBUTION DIVISION

Cast Iron Pipe Standards Committee

(1) General observance of the use and values of the cast iron pipe standards already adopted and consideration of any suggested or proposed changes in such standards or specifications for cast iron pipe or special castings.

(2) A study and report on the results obtained where installations have been made of the new type of "B" bell with cement joints.

(3) Contribution of articles on changes in the pipe standards or special castings or other committee matters for publication in the A. G. A. MONTHLY.

Consumers Meters Committee

(1) A study and report of a nomenclature or system of rating consumers' meters on the basis of their capacities instead of "light sizes" as is usually done at present.

(2) Action as an advisory committee on any questions or matters arising in connection with the consumers' meter or the meter testing routine, other work or recommendations made by the 1919-1920 Committee on Consumers' Meters.

(3) To suggest reduction of number and variety of sizes of meters used to some tentative list of standards.

Committee on Increasing Distribution Capacity

(1) A study and report of the estimated costs involved in the improvement of each of various types of existing distribution systems in order to most economically and satisfactorily, for company and consumer, distribute greater volumes of various gases in accordance with various increased consumptions by 10 per cent. increments up to 100 per cent. increase over the existing demand.

(2) A study and report of the existing and proposed distribution equipment and methods with an object of setting forth the various distribution practices now existing and attempting to improve and standardize same where possible.

Electrolysis Committee

(1) Cooperation with the American Committee on Electrolysis, Bureau of Standards, Regulatory Bodies and others upon electrolysis questions and investigations affecting the gas industry.

(2) Action as an advisory committee upon electrolysis questions.

(3) Preparation of pamphlet of elementary instruction for purchase and use of instruments and apparatus for study of electrolysis by small gas companies.

CHEMICAL DIVISION

Chemical Committee

(1) Determination of a plan for the distribution of special samples of materials, used in the gas industry, to various laboratories for the purpose of testing them by the proposed methods given in the revised edition of the Gas Chemists' Handbook and other special methods with the object of developing standard test methods for gas chemists.

(2) Action as an advisory committee on all chemical questions which may be referred to it.

(3) Preparation of articles on developed or standardized test methods for publication in the A. G. A. MONTHLY.

Gas Coal Specifications Committee.

(1) A study and report of specifications for coals intended for the production of gas.

(2) Cooperation with the sub-committee on "Specifications for Gas Coal" of Committee D-5 on "Coal," of the American Society for Testing Materials.

Committee on Gas Pipe and Meter Deposits

(1) Continuation of investigations concerning the nature of and prevention of deposits in pipes and meters started by the 1919-1920 Committee on Dust and Sulphur Deposits, etc., in Meters and Services.

Purification Committee.

(1) A study and report of the compositions, characteristics, best methods of determination, etc., of the sulphur bearing constituents of gases produced and distributed for use in cities and towns.

(2) Bibliography and review of the literature on the above.

(3) Continuation of the researches and work on the subjects of hydration and alkalinity and determination of the latter in both coal and water gas, and report of the results of such work.

(4) A study and report of what has been done and is being done upon the subject of liquid purification.

(5) Trials of test methods proposed by 1919-1920 Committee on Purification.

(6) Distinction between activity and capacity of oxide.

BY-PRODUCTS DIVISION

The work of this Division will be carried forward through the preparation of three papers along the following lines:

(1) A paper designed to show that it would be to the best interests of all concerned to have the gas industry keep out of the by-product refining business.

(2) A paper from some company engaged in the manufacture of gas that believes it would be to the best interest to take up the subject of refining by-products.

(3) A paper from some company engaged in the manufacture of gas that believes it would not be to the best interest of the company to take up the refining of its by-products, but does think it should make a study and better preparation of its by-products for the existing outside market.

PUBLICATIONS DIVISION

Nomenclature Committee

(1) Completion of a glossary of technical words, terms and phrases used in the gas industry.

Treatment of Contaminated Water at Reading

By GEORGE B. BAINS, 3d.

Reprinted from the U. G. I. Circle.

THE city of Reading is situated on the Schuylkill river. The clear effluent from the gas works after passing through the usual separators has, until very recently, been flowing directly into the river. All surface drainage from the city without being treated, goes into the river, and all sewage, after being treated and filtered, likewise flows into it.

About twenty miles below Reading is located the city of Pottstown with a population of about 15,000. This city takes its drinking water from the Schuylkill river after the water has been treated by filtration and chlorination. The effluent from the Pottstown gas works goes into the Schuylkill as well as the effluent from the Phoenixville gas plant, the Rainey-Wood Coke Company and Coopers Creek Chemical Company, both of Conshohocken. The city of Norristown takes its drinking water from the Schuylkill river, and a portion of the Philadelphia supply comes from the same source.

Several winters ago a strong, disagreeable odor and taste were noticed in the drinking water in Philadelphia, and to a slight extent, in Pottstown. At first it was thought this was due to decayed organic matter along the banks of the stream; later, it was traced to gas works effluent. While this effluent in summer had no taste nor odor when dissolved one part in two hundred parts of clear water, in winter there was still an appreciable taste and odor when the solution was one part in ten million. The taste and odor were probably due to higher olefins and some naphthalene in solution in the effluent, which becomes a gas and is dissipated in the air in summer, but will not gasify under the low temperatures in winter. As Reading has the largest gas plant along the river, we naturally received the blame for all the troubles below us, and the State Board of Health directed us to remedy conditions. After a number of conferences, in which we offered to make any changes or install any apparatus they might advise, they came back with the statement that the only solution of the problem was to keep the effluent out of the river entirely, in which case there could be no contamination. This was the problem we had in Reading, and which we have solved to our complete satisfaction.

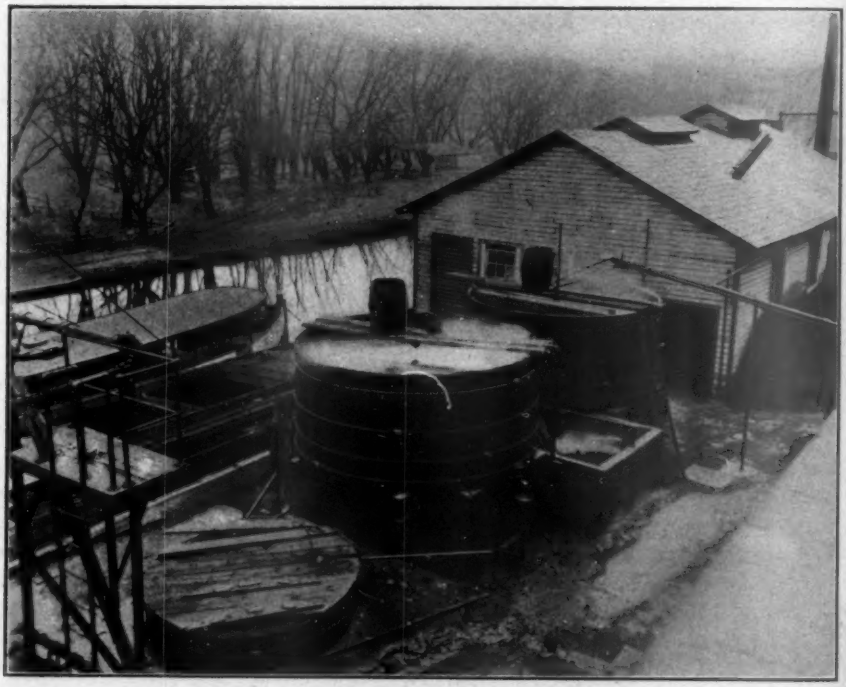
Our treating and filtering system as installed consists of two 5,000-gallon wooden tanks for treating the water, two sand filters, one having an area of 50 square feet, the other 65 square feet, and one storage tank of about 3,000-gallon capacity. All excess contaminated water from our separators is pumped into our relief holder tank, and from there it flows by gravity into the first 5,000-gallon tank where it is treated with copperas, ½ pound of copperas being used for each 1,000 gallons of water treated. The copperas is first put in solution and the solution drips slowly into the tank in the proportion above stated. A certain amount of settling immediately occurs in this tank. The treated water then flows into the second tank from an opening about two-thirds of the way up from the bottom of the tank, this in order to have

as little agitating effect as possible. The water in the second tank is treated with caustic soda, ¼ pound to 1,000 gallons of water. This causes a further settling, and then the water flows at a slow, constant rate over the sand filter beds. These beds are made up of coarse coke or clinkers on the bottom, then finer coke with about a foot of sand on top. The water from the filter beds flows into our storage tank, where it is pumped through the feed water heater into the boilers.

While city water upon analysis shows about 10 grains of solids, the treated water we are putting into our boilers shows only about 2 grains of solids. Since the installation was made we have made a number of examinations of our boilers and can find no deleterious effect on plates or tubes.

When we first decided to install this system we estimated that in a plant the size of Reading it would be necessary to treat from 3,000 to 5,000 gallons of water per day. We soon found that we had from 10,000 to 20,000 gallons to treat. This was due to clear water used in hydraulic valves and other operations flowing into the separators. Changes were made in our piping system so that now this clear water flows directly into the river and only the contaminated water is treated. This contaminated water amounts now to from 3,000 to 5,000 gallons per day, depending upon our make and any rainfall which may become contaminated.

In discussing this process with a number of gas men and with the State Board of Health, the question frequently arose, "Why does one gas plant have an excess of water and another gas plant apparently have none?" Upon investigating this question, we found that in every case where a gas plant had no excess water there was a pit holder or some other underground structure through which excess water was undoubtedly leaking into the ground. In the ordinary water gas plant an excess of steam is always used in the generators and a portion of this passes through the machines as water vapor. This is clearly an excess of which care must be taken. In addition to this there is the water which is displaced by tar in the relief holder tank and a certain amount of clear water from steam drips and other places which becomes contaminated and flows into the separators.



A Technical Committee will be appointed to keep in touch with the research work on the most economical use of fuels to be undertaken by the U. S. Bureau of Mines and the American Society of Heating and Ventilating Engineers.

The Rapid Determination of Water in Tar Emulsions*

W. W. ODELL and E. W. THIELE

(*Published by Permission of the Director of the U. S. Bureau of Mines.*)

Introduction

As a part of the gas research program conducted under a cooperative agreement between the Engineering Department of the University of Illinois, the Illinois Geological Survey, and the U. S. Bureau of Mines, a study has been made of the factors causing or affecting the formation of the tar-water emulsions in the process of manufacturing water gas. This investigation was made after the research committee of the Illinois Gas Association suggested that the problem was one requiring further study.

In conducting this investigation the Peoples Gas Light and Coke Company cooperated by furnishing the use of one of their laboratories in Chicago, by assigning E. W. Thiele to take an active part in the work, and by other expressions of interest in the experiments conducted.

In the course of this study it became desirable to have a short and simple method for determining the water content of tar emulsions. This paper presents two such methods which were employed by the writers and which may be of interest to others.

Nature of Tar Emulsion

Tar emulsion is essentially tar in which droplets of water of various sizes are suspended. Strictly speaking, there may be almost any amount of water in the suspension. It would be unusual, however, to speak of a tar with 10 per cent. water as an emulsion. On the other hand, the water content may be very large, sometimes as high as 85 per cent. of the whole. Such an emulsion, in spite of its being mostly water, will not mix with water, for each water drop is completely surrounded by tar. On the other hand, it may be readily diluted with more tar, or with any of the solvents for tar, since the tar in the emulsion forms a continuous network, to every part of which the solvent can penetrate.

Previous Work on This Determination

Aside from the various modifications of the distillation methods, there seem to be only two methods which have been used to determine water in tar. Brunkow[1] evaporated a heavy oil-gas tar, containing no light oils, in a drying oven, while Kayser[2] has described a calcium carbide method. It is evident that the former is of very limited application; the latter, though probably accurate, is difficult to carry out and requires elaborate apparatus.

The standard method of determining the water in tar is, of course, by distillation. In the method of the Barrett Company, as described by Weiss,[3] 200 cubic centimeters of the emulsion are mixed with 200 cubic centimeters of light oils and distilled to 400° F., the water being collected and measured. An accuracy of 0.1 per cent. is claimed for the method.

* Paper presented before the Illinois Gas Association Convention, March, 1921. The full report of this investigation will soon appear in bulletin form.

[1] Tar from California Oil Gas. Brunkow, *Gas Age*, **38**, 280 (1916).

[2] *Proceedings Pacific Coast Gas Ass'n.*, **8**, 458 (1910).

[3] Methods of Analysis in the Coal Tar Industry. I. Crude Tars, Weiss, J. M., *Jour. Ind. Eng. Chem.*, 10, 734 (1918).

Considering the various sources of error inherent in the method, such as the sticking of water to the sides of the condenser and the solubility of water in the oils, this would seem to be the extreme limit; if the mixture shows any considerable tendency to "spit" (froth and boil over) the limit will be much higher. A determination by this method also requires a considerable amount of time and attention on the part of the analyst, as well as a good deal of desk space.

There is, however, another method which, so far as we are aware, has not been used for tar, but has been much used for the analogous petroleum emulsions. It is common practice to determine water in these by adding to them a light gasoline. The mixture is then centrifuged, whereupon the water goes to the bottom and its volume can be read directly.[1] This method is the same in principle as Method I, described below.

Method I—Centrifuging with a Heavy Solvent

This makes use of the fact that tar emulsions can be mixed with heavy solvents. The tar is completely dissolved in the solvent, so that the water droplets are suspended in a liquid which is not, like tar, of nearly the same specific gravity as water, but is much heavier, and also much thinner than tar. Under these circumstances it is not difficult, upon centrifuging, to bring all of the water to the top where its volume can be easily measured.

The apparatus for carrying out this method can be obtained ready-made, since ordinary milk and cream testing apparatus is very suitable for use in this way. In our work we used an ordinary hand centrifuge made for milk testing, and built to accommodate eight bottles at one time. A speed of about 2,000 revolutions per minute could be attained with this apparatus.

The form of bottle holds about 50 cubic centimeters and has a long slender graduated neck. The graduations are numbered, each unit representing 0.2 cubic centimeter.

The qualities most desired in a solvent for use in this method are that it should be a fluid of high specific gravity, a good solvent for tar and immiscible with water. Carbon tetrachloride and carbon bisulphide, of common liquids, best fulfill these conditions. We found the latter to be slightly the better of the two; but its ready inflammability and disagreeable odor led us to prefer the carbon tetrachloride.

With most tars, however, when they are mixed with the solvent and centrifuged for a reasonable time in a hand centrifuge, there is at first sight not a complete separation of tar and water. The upper portion of the neck of the bottle contains clear water, and the body contains solvent with tar dissolved in it. But between these is a material which is somewhat like the original emulsion, being dark and rather thick. It has no sharp upper boundary. It varies in amount with different tars, being generally most abundant with the most obstinate emulsions, in which it may occupy more room than the clear water.

On closer inspection, however, it is seen to be lighter in color than the tar solution below, and to have a sharp lower boundary. If now a glass rod be inserted in the bottle, practically the whole of this material can be drawn out, sticking to

[1] Methods for the Determination of Water in Petroleum and its Products. Allen & Jacobs, *Bureau of Mines*, Technical Paper 25 (1912). This gives an excellent review, with references, of all the methods proposed for determining the water in petroleum emulsions.

the rod. If it is then rubbed on glass, the water in it will separate, and it is then seen that the bulk of the rest, which consists mainly of carbon, is very small. In other words, the whole part of the liquid which is above the sharp line between the tar solution and the sludge may be considered, without any great error, as being all water. If greater accuracy is desired a longer centrifuging will reduce this sludge still further, and even cause it to be eliminated. Warming the solution before centrifuging helps in the separation.

Seen from above, the surface water-carbon bisulphide and water-carbon tetrachloride is convex. In the centrifuge, however, such surfaces are flattened out, so that the line of demarcation on the neck of the cream bottle represents a flat surface of contact, since the stain will remain even when the meniscus changes shape—if the sludge permits a change of shape. It is, therefore, necessary to allow for this in reading the upper surface—a point intermediate between the upper and lower edges of the meniscus being chosen.

The method, as we carry it out, is as follows: Weight out 10 grams of tar emulsion into a cream bottle. Fill the bottle nearly to the neck with carbon tetrachloride and mix well by shaking carefully. Fill the bottle to the top graduation with carbon tetrachloride and centrifuge. Two or three minutes at 2,000 revolutions per minute are ample for most determinations. Read the number of divisions occupied by the water, counting all the sludge as water, and taking as the upper mark a point half-way between the top and bottom of the upper meniscus. Twice the number of divisions equals the per cent. of water by weight. If per cent. by volume is desired, take 10 cubic centimeters of emulsion in place of 10 grams.

The cream bottles can be obtained with necks of varying diameters. We made use of 30, 35 and 50 division bottles, according to the amount of water in the tar. There are also obtainable 10 division bottles, called milk bottles. The fewer the number of divisions, the smaller the neck, so that these bottles are more accurate for smaller amounts of water, but the slender neck makes it somewhat difficult to fill them.

In some experiments made with a synthetic tar emulsion prepared from anhydrous tar, carbon, and water it was found that the results seemed, as might be expected, slightly high, but the differences were within the necessary errors in reading the volume of water. The method, for large amounts of water (say 75 per cent.), is accurate within the limit of 1 per cent. It is more accurate the smaller the amount of water present in the emulsion.

It is very evident that this method is more rapid than the distillation method. It is easy to make two determinations by this method in less time than it would take to set up the apparatus for a determination by distillation.

Eight determinations can be made and the apparatus cleaned in half an hour.

Method II

This method depends on the fact that carbon black has a very strong absorbing power for the oils of which tars are composed. Carbon black is a light, fluffy powder, somewhat similar to lampblack, made by the imperfect combustion of natural gas. When this is added to oils or

tar in proportions depending on the character of the oil, it forms a pasty mass, of the consistency of a heavy putty. The amount required to do this with tars is about one-fifth the weight of the tar. The tendency to do this is so strong that when carbon black is added to a tar emulsion it will draw the tar, as it were, away from its network around the water, leaving the water drops free to unite and be poured off.

The method of making a determination is very simple. We found a mortar a convenient receptacle in which to perform the operation. Weigh out into a mortar 100 grams of the emulsion. Add successive small portions of carbon black, meanwhile mixing well with a spatula until the residue becomes a thick paste, similar to thick putty, pouring off into a graduate the water that separates from time to time. Knead the paste well with a spatula or pestle until no more water separates. The cubic centimeters of water separating represent directly the per cent. of water in the original emulsion.

It is evident that the accuracy of this method is greater the larger the amount of water present, since the chief source of error is the water retained in the paste. We found that we could represent this loss very well by adding to the water found 2 per cent. of the percentage of anhydrous tar. With this correction, the results obtained were very close to the true value. Not enough work was done to determine whether this factor is suitable for all varieties of tar emulsions. Probably each analyst can determine this factor for his particular use. It will be seen that for emulsions of high water content the correction is not of much importance.

Discussion of the Methods

Applicability.—The distillation method works easily and quickly for tars of low water content, but for tars of high water content it becomes tedious and difficult. Method I, while suitable for all percentages of water, is most satisfactory for emulsions with a low water content. Method II, on the contrary, is best suited for emulsions of high water content.

Cost of Materials.—This is small for all three methods, and need not be considered, in comparison with other factors.

Apparatus Needed.—In this respect Method II is most favorable as its requirements for apparatus and materials are few. Method I, on the other hand, requires a centrifuge and special glassware. The distillation method occupies an intermediate position.

Time.—In regard to time, the two methods here proposed are far in the lead, compared to the distillation method.

Accuracy.—Here a carefully conducted distillation should have the advantage. which of the other two methods is the better depends on the water content of the tar.

In conclusion, it seems probable that for the sale of tar and tar emulsion the methods here proposed can hardly compete with the distillation method, especially as the latter is quite firmly entrenched in contracts. For routine works analyses, however, where the highest accuracy is not required, those methods will, it is thought, be found very useful, as they require but a small fraction of the time that a distillation demands. Especially is this true of Method II. Many laboratories may not find it profitable to invest in a centrifuge, but a can of carbon black costs little and may save a good deal of time and trouble.

A Practical Continuous Recording Calorimeter

LOUIS N. RANCKE, Washington, D. C.

THROUGH the courtesy of Mr. James S. McIlhenny, Chief Engineer, Washington Gas Light Co., D. C., experiments have been conducted by Dr. C. B. Thwing of The Thwing Instrument Co., Philadelphia, and Dr. Louis N. Rancke, Supt. East Station Washington Gas Light Co., D. C., which have resulted in the development of a practical Continuous Recording Calorimeter suitable for recording the B. t. u. value of the gas as manufactured or distributed.

The instrument is sufficiently sensitive to operate within a given range of accuracy of ½ of 1% without requiring excessive attention and adjustment after being set up and adjusted for proper operation.

A small test holder to contain 50 ft. of gas of known B. t. u. was constructed. From this standard gas was developed a specially designed thermocouple of suitable composition to develop the proper E. M. F., when suspended in the stack of a cased in retort, above a Fisher burner, burning a measured quantity of air and gas per hour; the air and gas being maintained at a constant temperature.

Constant pressure is maintained through a dual system of governors, one of which is on the service line, and the other in the case, enclosing instrument, and in advance of the gas equalizing coils. Constant temperature of gas and air is maintained through the medium of a thermostatic chamber, electrically heated and controlled, which automatically regulates the temperature to within 1° F.

After the gas temperature has been equalized the flow is controlled by means of a micrometer cock, with supplementary adjustments at burner, where the air supply is also adjusted to give proper combustion.

An ink record in B. t. u. as developed is made each minute on chart graduated from 500 to 700 B. t. u., where standard of gas is 600 B. t. u. The record in B. t. u. as developed through the medium of the differential E. M. F. between the hot and cold ends of the thermocouple, can be read as recorded in B. t. u. without correction factors or adjustments.

For this recording a Thwing Instrument Co. Continuous Recording Instrument was adapted to meet the conditions required. The complete apparatus is enclosed in a suitable insulated container with glass front so that all parts may be inspected or adjusted as required.

The instrument has been in experimental use, for several months, at the East Station of The Washington Gas Light Co., D. C., and may be inspected by gas men who so desire, by arrangement with the Superintendent, Louis N. Rancke. Having reached the stage for commercial development, it will be manufactured by the Thwing Instrument Co. of Philadelphia, Pa.

Charts of actual day's records show that the instrument absolutely follows the widest variations of the gas in the recording.

GAS CHEMISTS HANDBOOK

Revised Edition

J. Watson Bain, B. A. Sc., past Chairman, Society of Chemical Industry (Canadian Section), in reviewing the first edition of the Gas Chemists' Handbook in 1916 said:

> "Until the appearance of this volume there was no publication which dealt in a comprehensive manner with the various problems which fall to the lot of the gas chemist. * * * It would be difficult to conceive of a gas chemist to-day who would not desire to have this book on his shelf for reference, if not for daily use."

In the five years since the above review was written, laboratory methods have changed and many have been added through new developments.

The experience gained through five years' use of the Handbook has also shown much that might profitably have been included in the first edition.

Two years' careful revision by the Chemical Committee has added these new and revised methods to the 1921 edition of the Gas Chemists' Handbook.

It is more indispensable to your laboratory to-day than was the first edition in 1916.

AMERICAN GAS ASSOCIATION

NEW YORK, N. Y.

Price $6.00 U. S. and Canada
$6.50 in Foreign Countries

Associations Affiliated with A. G. A.

Canadian Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—C. S. Bagg, Montreal
V.-Pres.—E. H. Caughell, St. Thomas, Ont.
2d V.-Pres.—Col. D. R. Street, Ottawa, Ont.
Sec.-Tr.—G. W Allen, Consumers' Gas Co., Toronto
Conv., Aug. 25 and 26, 1921, Montreal

Empire State Gas and Electric Association

Date of Affiliation—Nov. 21, 1919
Pres.—H. W. Peck, Mohawk Gas Co., Schenectady, N. Y.
V.-Pres.—C. G. M. Thomas
Treas.—E. H. Rosenquest
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.

Illinois Gas Association

Date of Affiliation—Mar. 19, 1919
Pres.—H. H. Clark, 325 Peoples Gas Bldg., Chicago, Ill.
Sec.-Tr.—R. V. Prather, DeWitt-Smith Bldg., Springfield, Ill.
Conv., 1922

Indiana Gas Association

Date of Affiliation—April 24, 1919
Pres.—W. W. Goodrich, Winchester, Ind.
V.-Pres.—J. D. Forrest
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., 1921

Iowa District Gas Association

Date of Affiliation—May 21, 1919
Pres.—W. H. Taylor, Omaha, Neb.
Sec.-Tr.—H. R. Sterrett, Des Moines Gas Co., Des Moines, Ia.
Conv., 1921

Michigan Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—J. W. Batten, Detroit City Gas Co., Detroit, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., 1921

Missouri Association of Public Utilities

Date of Affiliation—June 18, 1920
Pres.—J. H. Van Brunt, St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn. Affiliation Com., Mexico Power Co., Mexico, Mo.

New England Association of Gas Engineers

Date of Affiliation—Feb. 19, 1919
Pres.—Burton Smart, Portland, Me.
V.-Pres.—V. E. Bird, New London, Conn.
R. E. Wyant, New Haven, Conn.
Sec.-Tr.—J. L. Tudbury, Salem Gas Light Co., Salem, Mass.
Conv., 1922

New England Gas Sales Association

Date of Affiliation—Oct. 1, 1919
Gov.—H. J. Pettengill, Jr., Blackstone Valley Gas & Electric Co., Pawtucket, R. I.
Sec.—M. Bernard Webber, 67 Milk St., Boston, Mass.
Annual Meeting, May, 1921

New Jersey State Gas Association

Date of Affiliation—April 25, 1919
Pres.—F. R. Cutcheon, Long Branch, N. J.
V.-Pres.—Jacob B. Jones, Bridgeton, N. J.
Sec.-Tr.—H. E. Mason, Consolidated Gas Co. of N. J., Long Branch, N. J.
Conv., April 13, 14, 15, 1921, Philadelphia

Pacific Coast Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—W. M. Kapus, Northwest Gas & Electric Equipment Co., Portland, Ore.
Sec.-Tr.—W. M. Henderson, 445 Sutter St., San Francisco, Cal.
Conv., Sept. 20-23, 1921, Del Monte, Cal.

Pennsylvania Gas Association

Date of Affiliation—April 10, 1919
Pres.—J. H. Keppelman, Reading, Pa.
V.-Pres.—E. L. Smith, Towanda, Pa.
Luther Gaston, Lebanon, Pa.
Sec.-Tr.—W. O. Lamson, Chester County Gas Co., West Chester, Pa.
Conv., April 13, 14, 15, 1921, Philadelphia

South Central Gas Association

Date of Affiliation—Oct. 15, 1919
Pres.—C. B. McKinney, 505 Scollard Bldg., Dallas, Tex.
1st V.-Pres.—F. L. Weisser, San Antonio Public Service Co., San Antonio, Tex.
2d V.-Pres.—F. C. Armbruster, Southwestern Gas & Electric Co., Shreveport, La.
Acting Sec.-Tr.—C. H. Seidenglanz, Dallas, Tex.
Conv., Oct. 11, 12, 1921

Southern Gas Association

Date of Affiliation—May 20, 1919
Pres.—E. C. Stothart, Charleston, S. C.
1st V.-Pres.—J. A. Forney, Charlotte, N. C.
2d V.-Pres.—J. C. Nichols, Bluefield, W. Va.
Sec.-Tr.—G. H. Smith, City Gas Co., Norfolk, Va.
Conv., May 31, June 1-2, 1921, Savannah, Ga.

Wisconsin Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—J. P. Pulliam, Milwaukee, Wis.
Sec.-Tr.—Henry Harman, 182 Wisconsin St., Milwaukee, Wis.
Conv., 1922

OTHER ASSOCIATIONS

Natural Gas Association of America

Pres.—Harry J. Hoover, Cincinnati, Ohio
Sec.-Tr.—Wm. B. Way, 904-5 Oliver Bldg., Pittsburgh, Pa.
Conv., May 16, 17, 18, 19, 1921, Cincinnati, Ohio

Society of Gas Lighting

Pres.—Alex. H. Strecker, Newark, N. J.
V.-Pres.—W. Cullen Morris
Sec.—Geo. G. Ramsdell, 130 E. 15th St., New York, N. Y.
Treas.—Wm. J. Welsh
Conv., Dec. 8, 1921, New York, N. Y.

Southwestern Electrical and Gas Association

Pres.—Burr Martin, Dallas, Texas
V.-Pres.—A. Hardgrave
C. E. Corder
A. H. Warren
Sec.—H. S. Cooper, Slaughter Bldg., Dallas, Texas
Treas.—J. B. Walker
Conv., 1921

QUESTION BOX

THE questions and answers on accounting subjects in the Question Box have been contributed by the Accounting Section Committee on State Representatives, Mr. Ewald Haase, Chairman, who will be glad to receive inquiries from any of our members on their accounting problems.

Questions and answers under "General Problems" are the result of inquiries received at Association headquarters and answered through the committees of the various Sections or from the Association files.

Answers from our members are solicited on questions which come within their experience and such answers should refer to code number of Question, A-1, G-1, etc.

—Editor.

ACCOUNTING PROBLEMS

A-13 In a recent order by the Michigan Public Utilities Commission the following ruling was made:

> "Item 11—The company may require new customers to make a deposit of a reasonable amount to insure payment of gas bills, but when the customer shall take advantage of the discount herein allowed for at least eleven out of twelve continuous months, such deposit shall be refunded."

We consider this ruling unfair and would appreciate advice as to the rules relating to return of consumers' deposits at present in effect in other States.

ANSWERS.

Association Headquarters

Answers were received and are on file at Headquarters from the following State Representatives:

States where the Commission has a specific rule in effect relating to deposits:

Oregon
Utah
Massachusetts
Missouri
Connecticut

None of the rules laid down by the above Commissions specifies a time limit after which the company must return deposits. Generally they specify the deposit shall not exceed an amount equal to two months' estimated bill and that interest shall be paid on all deposits—such interest in most cases specified to accrue after deposits have been held more than three months.

States where no specific rule has been adopted by the Commission:

Idaho
Virginia
Colorado
Illinois
Maine

Replies indicated that in the above States the companies have adopted their own rules which largely follow the principles of the Commission rules quoted above. In Illinois, Colorado and Maine, company rules have been filed with the Commission and approved by them.

Mr. P. G. Ord, Comptroller of the Montreal Light, Heat & Power Co., Montreal,

Canada, outlined the policy of that company which is substantially in accord with U. S. practice.

A-14 What is the general method used in charging off to merchandise ledgers, material returned to stock account of non-payment.

Gas stoves, water heaters, etc., are generally sold on lease and after a party has made one or two payments and then fails to make further payments and the material is returned to stock, is it customary to charge the difference between the value of the material when returned to stock and the balance as due on the books to "Bad Accounts" or is it charged back against "Merchandise Sales"?

ANSWERS.

Mr. J. W. Heins, The United Gas Improvement Co., Philadelphia, Pa.

The general practice followed in this situation is to return the appliance to Storeroom with a reversing journal entry, giving credit to the customer's account for the amount due, and letting the particular account, Gas Stoves, Water Heaters, as the case may be, suffer any loss entailed. This is done for the reason that it is not considered advisable to charge to Uncollectible Accounts any arbitrary amount for depreciation, since such account in any instance is ever likely to be collected. The consumer, whose appliance is returned, naturally feels that their account is closed; that they owe the company nothing further for this particular purchase, and, as stated above, we do not feel it to be good practice, to set up in our Uncollectible Accounts any such amounts.

We do create what might be termed a Black List of the cases, along with any other bad accounts we may have, and take particular pains to prevent any further purchase, except for cash with the order by these particular customers.

The articles thus taken back can, as a rule, be put in good condition for re-sale and at sufficient profit to offset any loss entailed through the return to Storeroom, as outlined above.

Mr. Burton Smart, Portland Gas Light Co., Portland, Me.

It is the custom of this company to charge the difference between value of material returned to stock and the balance due on customers' accounts to Bad Bills.

Mr. W. A. Sauer, The Peoples Gas Light & Coke Co., Chicago, Ill.

Particularly where the merchandise sold is taken up and returned to stock, where an account has become past due or where conditions arise by which we know the balance due on an account is uncollectible, an order is issued to remove the merchandise covered by the account. When notified that the material has been removed, the customer's account is credited with the outstanding balance and the subdivision of the sales or income account is charged with the same account.

Material brought in is charged to stock at cost, but if in poor condition at an appraised value, and the sales or income account is credited with that value; the result being that the sales account is charged with the loss or difference between stock value and the uncollectible balance on the customer's account, which represents the sales loss incurred by this transaction.

An account which shows a delinquent balance and upon which we are unable to realize any credit due to bringing in material sold is written off at stated intervals as uncollectible, but in all cases the sales revenue must bear this loss.

Mr. George R. Horning, Utah Gas & Coke Co., Salt Lake City, Utah

In the first place, we require a large enough payment with the order to pay for something more than the expense of delivering and setting up. The monthly payments, if the appliance is sold on installment terms, will more than keep pace with depreciation on the article. Therefore, where it is necessary to take back a used appliance for nonpayment the question of it being a bad account is rarely considered as in nearly every

case it is possible to resell for an amount that will cover, or more than cover, the balance due on the first sale. When a return is made to our stock under these circumstances a credit memorandum for the balance due is posted to the customer's account and our Appliance Sales Account is charged and Accounts Receivable Appliances credited. The appliance is charged into stock and Appliance Sales Account credited with the appraised value based on its general condition, with regard to its cost now and not what it might be sold for. This method does not inflate nor minimize the value of stock on hand.

By accounting for the transaction in this manner Appliance Sales Account is sometimes charged with more for the balance due on account than that it receives credit for the stock value of the material returned. However, when the Sales Department sells the article again at a profit on its appraised value the Sales Account recovers the loss, as a rule, on the second sale.

With reasonable care on the part of the Credit and Collection Department, therefore, we believe that our accounting procedure more correctly represents the business done by the New Business Department.

Mr. P. W. Cannon, The American Gas Company, Philadelphia, Pa.

If the article returned was purchased during the current year, a credit for the balance still due from the customer is entered through the Sales Book and charged against the proper Mercantile Account. A second entry is made charging Store Room, crediting the proper Mercantile Account, at the depreciated value.

If the article was purchased prior to the current year, we credit the Customer's Account for the balance unpaid and charge the depreciated value of the article to Store Room. The balance is charged off to Bad Debts. This latter way of handling the transaction does not in any way affect the total sales for the current year.

Mr. Ewald Haase, Milwaukee Gas Light Co., Milwaukee, Wis.

Upon delivery of any merchandise to a consumer, the Merchandise Sales Account is charged with the cost, plus expense of handling or the charge out value of the merchandise, and the stock account credited with the same amount.

The amount to be billed to the consumer is then charged to the Petty Ledger Account and the same credited to the Merchandise Sales Account. Upon receipt of a payment from the consumer the Petty Ledger Account is credited with the amount paid, and the cash account charged accordingly.

In the event of any material being returned before being paid for in full by the consumer, the balance owing is cleared from the petty books by an allowance, charging the Merchandise Sales Account with the balance due and crediting the Petty Ledger Account with the same. The Stock Account is then charged with the actual value of the material returned and the Merchandise Sales Account credited with the same amount.

The above method results in the Merchandise Sales Account carrying the loss incurred due to return of merchandise sold.

Mr. C. W. Platt, Portland Gas & Coke Co., Portland, Ore.

Like most gas companies doing an appliance business, we sell a great many appliances on the installment plan, and it has been our practice to charge this business monthly with an amount accrued to meet not only bad debt losses of the ordinary kind, but also losses due to our inability to collect on shrinkage in value of appliances removed.

When it is found necessary to remove an appliance which has been sold on the installment plan, and which has not been fully paid for, a work order is issued for removal of such appliance, and upon its being turned in at the storeroom a credit is issued therefor, showing the per cent. condition which the appliance will be in when repaired, and the estimated cost to repair. A tag showing the removal order number is attached to the appliance, and subsequently this tag is removed and pinned to the storeroom requisition when the appliance is again issued from stock. In pricing the store credit the per cent. condition indicated is applied to the cost of a new appliance of the

same kind, and the estimated cost to repair is deducted therefrom. This credit in due course is charged to Stores, identified thereunder by the removal order number, and credited to the work order under which the appliance was removed. This removal order, having then been charged with the removal cost and credited with the salvage value of the appliance, is closed to the customer's account. If this account then shows a loss which cannot be collected from the customer, the amount is charged to the bad debt accrual.

A work order to repair the appliance is then issued, bearing a reference to the removal order number for identification, and this order when completed is charged to Stores, and, together with the salvage value previously charged thereto, becomes the stock price of the appliance.

Mr. O. L. Mackell, The Denver Gas & Electric Light Co., Denver, Colo.

On all merchandise returned, customer's account is given credit in full for balance due on same and stock account is charged with it.

If the appliance returned is in poor condition and not worth the amount credited, the bad debt files carry a memo card showing loss, and if customer opens a new account, he is made to pay the difference.

Mr. H. V. Armstrong, Sioux Falls Gas Co., Sioux Falls, S. D.

It has been the practice with this company in returning goods for non-payment, to let merchandise sales stand the difference between the value of the material and the balance due on the books. In a case where the amount due on an article is less than the store room cost, the article is charged back into stock at the lower figure, the cost of cleaning and putting the appliance in good shape is then added and the article resold at a reasonable profit.

Mr. W. R. Putnam, Idaho Power Co., Boise, Idaho

Material returned to stock on account of non-payment is charged to stock with an estimated value of the merchandise returned, crediting the consumer's account with the balance due and charging difference to Merchandise Earnings—in other words, we are cancelling the profit previously made.

GENERAL PROBLEMS

G-38 We are using in our city service saddles on all 4-inch gas mains. When I originally came here they were using saddles on all 6-inch mains as well. My previous practice had been to use the reducing street "T," tapping the 4-inch mains for both 1¼-inch and 1½-inch services, using the reducing street fittings at the main. Using saddles on our 4-inch services at present prices adds approximately $7.00 to the cost of each service. Have any of your members had experience with the standard connection without saddle in a very cold climate where the frost goes as deep as 7 feet?

ANSWERS.

Mr. G. I. Vincent, Syracuse Lighting Co., Syracuse, N. Y.

I do not understand whether your correspondent means by "saddle," a split sleeve, or not. Saddles are usually not used to add to the strength of a main, but for convenience in tapping. The split sleeve will, of course, greatly increase the strength at the point of tapping, and should always be used on 3-inch mains, and on mains of the larger sizes where large taps have to be made.

The coldest locality in which I ever operated, was in Des Moines, Iowa, where the frost frequently reached a point 18 inches to 2 feet below the main. The largest allowable tap in a 4-inch main was 1 inch, and if any larger taps than this were required, a split sleeve was used. Breakings at the tapping point where the 1-inch tap was used were so rare that I do not recall hearing of any at all.

Mr. D. W. Flowers, St. Paul Gas Light Co., St. Paul, Minn.

In reference to our method of connecting services to 4-inch mains, we will say that our mains are laid with about a 4½-foot cover, and that frost usually goes 6 feet, so that the mains are subjected to severe conditions. Up to two years ago it was our practice to use 1-inch tap in 4-inch mains. At that time we increased the standard size of services from 1¼ to 1½ inches, increasing the maximum tap in 4-inch mains from 1 to 1¼ inches. We have experienced no difficulty from an excessive number of leaks. We use a service tee and street ell to give flexible joint, and expect to continue this practice indefinitely.

Mr. D. A. Powell, Milwaukee Gas Light Co., Milwaukee, Wis.

We are not at the present, nor have we for about five years, used any 1-inch taps for any size services that we have laid. We have tapped the 4-inch mains 1¼ inches for 1½-inch service, which is our minimum size in use, using at the main a 1½ by 1¼-inch street ell and 1½-inch street ell. On 6-inch mains we are tapping 1½-inch taps for 1½-inch service connection using two 1½-inch street ells. When tapping 4-inch main larger than 1¼ inches and 6-inch main larger than 1½ inches, which is very seldom, we use a 4-inch or 6-inch service sleeve.

From our experience with the different size taps for service connection and from the results in the last four years, we are satisfied that 1¼-inch tap is not too large for a 4-inch main or 1½-inch tap for 6-inch main.

We have spent some time with both our service and main gangs instructing the foreman and mechanics as to the tapping of holes for service connections with the result that all of the taps are made with the proper tools and to such a depth that there is no strain placed on the pipe when the elbows are screwed into position. We think that a good deal of the breaks in the main pipes at service taps are caused by improper tapping, either by a dull tap or by not having the tap run deep enough so that it is necessary to put considerable force on the street ells in order to insert the street ells the required number of threads.

We have had extreme winter conditions where the frost has been down to and below our mains and so far have not experienced any difficulties in using the above sized taps for 4-inch and 6-inch mains and expect to continue using the above named sizes in the future.

Mr. Walton Forstall, The United Gas Improvement Contracting Co., Philadelphia, Pa.

If the mains referred to are cast iron, then, in my opinion, money is certainly being wasted in using any saddles in connecting the ordinary size service to the mains. Your correspondent mentions saddles; I do not suppose he means split sleeves, but some fitting either entirely alike or similar to saddles used with a steel main. The schedule of service connections in "A Manual of Gas Distribution" represents what is considered the best practice in this country for cast iron mains. For steel mains, service saddles are used in 4-inch and 6-inch sizes.

Mr. A. I. Snyder, Engineer, Detroit City Gas Co., Detroit, Mich.

I have had a review made up of data that was compiled covering repair work which we have done over a period of two years. The conclusion that we have drawn from this review is that it is more economical to make 1¼-inch taps in 4-inch mains than to use split sleeves for service connections in 4-inch mains. About one-half of the 4-inch mains that were found to be broken, were broken at the 1¼-inch taps. The repair costs are considerably less than the interest on the investment would be should we use split sleeves on all 1¼-inch taps in 4-inch mains.

Our practice has been to make 1¼-inch taps in 4-inch mains without the use of split sleeves. About two years ago we questioned this practice and proceeded to compile data from which to draw further conclusions. From the conclusions that we have made we

will continue the practice of making 1¼-inch taps in 4-inch mains without the use of split sleeves.

Mr. G. T. Macbeth, Westchester Lighting Co., Mt. Vernon, N. Y.

This company did not start to use service saddles or split sleeves for service until about twenty years ago. Now these so-called service sleeves are used on all 3-inch or 4-inch mains for service connections except connections for lamp service from 4-inch mains. The cause of their being brought into use was on account of the large number of 4-inch mains found broken at service connections.

We have never had any trouble with 6-inch main pipe breaking on account of tapping for service connection, therefore, the use of service sleeves on 6-inch main never came into practice.

I do not quite understand why a service sleeve costs $7.00. We own our own pattern; they are made at a local foundry; there is no machine work on them; they are put on the gas mains with cement joints.

Enclosed please find blue-print showing the sleeve.

G-39 I am very anxious to know the best way of treating a steel holder to prevent rusting. The holder in question is of 1,500,000 cubic feet capacity, three lifts, with a concrete tank.

It was painted when erected and at the end of about two years we found little blisters here and there in the paint and upon these being scratched, considerable rust was found underneath. We employed laborers with wire brushes going over the whole thing and repainted with the best graphite paint we could procure. It is three years since it was painted and now we find the same trouble; little blisters all over with fairly thick rust underneath.

We have been told by a steel expert that the only way is to clean every bit of paint and rust, absolutely, with a revolving steel brush or something of that kind (I suppose a sand blast is out of the question as that would fill the cups and tank) and then when the steel was absolutely clean, red lead should be applied and when that was good and dry, carefully paint on top.

This is an elaborate and expensive process, demanding fine weather conditions, etc., and the writer wonders if there is no cheaper or shorter way.

ANSWERS.

Mr. John H. Braine, The Brooklyn Union Gas Co., Brooklyn, N. Y.

We have discovered no way of preventing the corrosion of the metal of our steel holders, except by painting them frequently enough so that the metal is at all times protected from the action of the elements.

If any parts of the metal should be attacked by corrosion, these portions should be first thoroughly scraped, wire-brushed if necessary, and then given a coat of red lead as a priming coat, before the final coat of paint is applied. Of course, a good grade of paint should be used for this work.

As a means of shortening the time required for removing scale from holders, where theer is considerable of this work to be done, we would suggest the use of compressed air.

Our outfit for this work consists of the following:

One Novo,10 horse-power gas engine connected to 6 by 6-inch Type 11 compressor with complete equipment all mounted on a steel truck; together with "NO" chipping hammers, chisels, air lines, etc. The above equipment was furnished by the Ingersoll-Rand Company.

G-40 What information is now available on gas fuels for torch cutting and welding and for heating furnaces for annealing and forging?

AMERICAN GAS ASSOCIATION, Inc.

Current List No. 44—May, 1921

Rate Increases and Changes.

Where information is not secured from company receiving increase, the source of information is noted in brackets. See Cumulative List No. 7, of March, 1921, for explanation of abbreviations. This list includes only increases reported as secured subsequent to March, 1921.

CALIFORNIA

San Diego: Co. reports third increase effective March 10, 1921. New rate: 1st 5 CCF or less 75¢ net—next 45 CCF $1.55 gross, $1.45 net—next 10 MCF $1.45 gross, $1.35 net—next 15 MCF $1.20 net—next 20 MCF $1.10—next 25 MCF $1.00—over 75 MCF 90¢ per M net.

COLORADO

Boulder: Co. reports second increase effective April 1, 1921. New rate: 1st 10 MCF $1.50—next 15 MCF $1.30—over 25 MCF $1.10 per M—disc. 10¢ per M—M. M. Chge. 50¢—P. P. Meters $1.50 per M.

CONNECTICUT

Bristol: Bristol & Plainville Tramway Co. reports increase effective July 1, 1920. New rate: 1st 15 MCF $1.60—next 15 MCF $1.55—next 20 MCF $1.50—next 50 MCF $1.45—over 100 MCF $1.35 per M—disc. 10¢ per M 10 days. Old rate: $1.35 gross, $1.25 net per MCF.

INDIANA

Brazil: Co. reports third increase effective Feb. 23, 1921. New rate: 1st 5 MCF $2.25—next 5 MCF $2.05—next 10 MCF $1.85—next 10 MCF $1.65—over 30 MCF $1.45 per M—penalty 10¢ per M 10 days.

Liberty: Gas Lt. & Fuel Co. reports increase effective Sept. 1, 1920. Flat rate $2.00 to $2.25—M. M. Chge. 75¢ to $1.00—penalty 10¢ per M 10 days.

KANSAS

Emporia: Co. reports decrease effective Feb. 15, 1921. New rate: 1st CCF $1.23—next 49 CCF 23¢—next 25 CCF 21¢—next 25 CCF 19¢—next 25 CCF 17¢—next 25 CCF 15¢—all over 15 MCF 13½¢ per C—M. M. Chge. $2.00.

MASSACHUSETTS

Lowell: Co. announced decrease effective April 1, 1921. New rate: 1st 50 MCF $1.60 net—next 50 MCF $1.40—over 100 MCF $1.35 net per M.

MICHIGAN

Pontiac: Co. reports fourth increase effective Feb. 25, 1921. New rate: 1st 10 MCF $1.60—next 15 MCF $1.50—over 25 MCF $1.20 per M—disc. 10¢ per M 10 days—M. M. Chge. 75¢. Birmingham and Royal Oak $1.65 per M—disc. and M. M. Chge. the same.

Saginaw: Co. reports second increase effective Feb. 25, 1921. New rate: $1.40 per MCF—disc. 20¢ per M 20 days.

MISSOURI

St. Joseph: Co. reports third increase granted by P. S. C. effective Jan. 1, 1921. R. T. S. Chge. changed to demand basis. New R. T. S. Chge. per meter per month 0 to 175 CF hourly demand 50¢ per month—175 to 225 CF 60¢—225 to 275 75¢—275 to 350 $1.00—over 350 CF per hour $1.25 per month.

NEBRASKA

Beatrice: Co. reports fourth increase effective April 1, 1921. New rate: $2.05 per MCF—disc. 5¢ per M 15 days.

NEW YORK

Owego: Co. reports third increase effective March 1, 1921. New rate: 50¢ per month consumer's charge plus $2.00 per MCF commodity charge—penalty 10¢ per M 10 days.

Patchogue: Gas Co. reports increase effective Nov. 15, 1920. New rate: 1st 75 MCF $1.90—over 75 MCF $1.70 per M net—M. M. Chge. $1.00. Old rate: 1st 10 MCF $1.75—next 5 MCF $1.50—next 35 MCF $1.25—over 50 MCF $1.15 net per M—M. M. Chge. $1.00.

A short term rate became effective Nov. 15, 1920, for four months $1.90 per MCF with a guarantee S. Chge. of $1.00 per meter per month and an additional season charge of $6.00 per meter, payable in advance.

Rochester: Co. reports decrease effective March 1, 1921. New rate: 1st 20 MCF $1.05—next 30 MCF $1.00—next 50 MCF 90¢—next 100 MCF 80¢—next 300 MCF 70¢—next 500 MCF 65¢—over 1000 MCF 60¢ per M—penalty 10¢ per M 10 days—S. Chge. 40¢ per consumer per month. Decrease made under order of P. S. C. issued on report of company for period covered by increased rate, and on very favorable contracts for coal and oil.

OHIO

Youngstown: Penn.-Ohio Electric Co. reports increase effective July 15, 1920. New rate: 1st MCF $1.85—next 9 MCF $1.80—next 15 MCF $1.73—next 25 MCF $1.65—next 50 MCF $1.57—next 100 MCF $1.50—next 300 MCF $1.43—over 500 MCF $1.35 per M—penalty 10¢ per M 10 days.

VIRGINIA

Newport News: Gas & Electric Co. reports old rate $1.00 per MCF. First increase effective June 1, 1920, $1.10 per M. Second increase effective Dec. 1, 1920, $1.50 per MCF. Third increase effective April 1, 1921. New rate: $1.60 1st 5 MCF—next 5 MCF $1.55—next 15 MCF $1.50—next 25 MCF $1.45—next 50 MCF $1.40—next 100 MCF $1.35—over 200 MCF $1.10 per M.

WYOMING

Sheridan: Gas & Fuel Co. reports increase effective March 1, 1921. New rate: 1st 3 MCF $2.75—next 3 MCF $2.55—next 4 MCF $2.35—next 10 MCF $2.15—next 10 MCF $1.95—over 30 MCF $1.75 per M—penalty 10¢ per M 10 days—M. M. Chge. $1.00—S. Chge. 50¢ per meter per month. Old rate: $1.70 to $1.00 graduated as above—P. P. Meters $2.75 per M.

(*Continued from page 282*)

the Committee and full information as to means of cooperation can be secured by writing to the member assigned to your territory as listed below:

MEMBER	TERRITORY
E. C. Scobell, Rochester Gas & Elec. Corp., Rochester, N. Y.	New York and Connecticut
Harry W. Anderson, Peoples Gas Lt. & Coke Co., Chicago, Ill.	Illinois, Wisconsin, Kentucky
J. P. Crowley, St. Paul Gas Lt. Co., St. Paul, Minn.	Minnesota, North Dakota, South Dakota
H. M. Eaton, 710 Union Trust Bldg., Detroit, Mich.	Michigan, Indiana, Ohio
W. E. Houghton, Los Angeles Gas & Elec. Co., Los Angeles, Cal.	California, Nevada, Utah, Arizona
J. E. McLeod, LaClede Gas Lt. Co., St. Louis, Mo.	Missouri, Kansas, Iowa, Nebraska
A. F. Mueller, Seattle Lighting Co., Seattle, Wash.	Washington, Oregon, Montana, Idaho, Wyoming
J. G. Reese, Cons. Gas, Elec. Lt. & Pr. Co., Baltimore, Md.	Maryland, Delaware, District of Columbia, West Virginia, North Carolina, Tennessee, Virginia
A. F. Short, Providence Gas Co., Providence, R. I.	Rhode Island, Massachusetts, New Hampshire, Vermont, Maine
K. L. Simons, El Paso Gas Co., El Paso, Tex.	Texas, New Mexico, Oklahoma, Arkansas, Louisiana
E. C. Stothart, Charlestown Cons. Railway Lighting Co., Charlestown, S. C.	South Carolina, Georgia, Florida, Oklahoma, Mississippi
P. A. Wilson, United Gas Improvement Co., Philadelphia, Pa.	Pennsylvania and New Jersey

Employment Bureau

SERVICES REQUIRED

Key No. 11

WANTED—Foreman for Carburetted Water Gas Plant in a city of 100,000 population. U. G. I. sets. Opportunity for advancement. Apply stating experience and wages expected. Address A. G. A.

Key No. 13

MECHANICAL ENGINEER—On operation, maintenance and efficiency of distribution system for gas company located in Western Pennsylvania. Requires men from 24 to 35 years of age, with qualifications to become an executive. Some experience on gas distribution and manufacturing desirable. Reply stating experience and salary expected and when available. Address A. G. A.

Key No. 15

SALES REPRESENTATIVE WANTED—Maker of well established and complete line of industrial gas appliances wants able salesmen with other non-conflicting lines to work on commission basis. Some highly profitable territory still is available. Write fully regarding your qualifications. This is a real opportunity. Address A. G. A.

Key No. 16

MECHANICAL ENGINEERS—Wanted by gas company in western Pennsylvania. Young man not over 30 years of age to assist superintendent in distribution work. Also one to assist plant superintendent. Technical graduate with at least one year's experience preferred. Reply stating education, experience, salary expected and when available.

Key No. 17

SERVICES OFFERED

WANTED—Position as Industrial Power and Fuel Engineer. Technical engineer and salesman of excellent qualifications for industrial power and fuel sales. Now employed $3000. Address—A. G. A.

Key No. 111

WANTED—Position as executive in a local office of a gas or a combination gas and electric company. Have had practical experience in all branches of commercial utility work. Have been successful in dealing with the public and promoting good will of utility companies. Educated in commercial and accounting methods as compiled by the N. C. G. A. and N. E. L. A. Well acquainted in office routine and very exact on details and execution of same. Address A. G. A.

Key No. 114

WANTED—A position with a gas appliance company having need for an all around man experienced in development and selling. Can furnish best of references. Address—A. G. A.

Key No. 116

POSITION WANTED—As General Superintendent or Engineer of good-sized company, by well known technical graduate of 18 years connection with the gas business. Experienced in every branch of the industry and has made good. Has been superintendent of one large company and manager of other smaller ones. Has himself laid mains, made gas, set ranges, purchased and sold appliances, etc., so that he knows the difficulties and the things to avoid. Noted for his ability to handle men. Well read and up-to-date in every particular. Address—A. G. A.

Key No. 117

WANTED—Position as manager in medium size town or as gas engineer by technical man with 9 years experience in all branches. Both syndicate and private operation. Has shown exceptionally good results. Address A. G. A.

Key No. 118

WANTED—Position as manager or superintendent with gas company in North Eastern States. Eight years experience in both coal and water gas. Married. Good references. Address A. G. A.

Key No. 119

WANTED—Position as General Manager of Gas or Gas and Electric Company in city of size or as assistant to chief executive in very large company. Operation, management, finance, rates and capitalization by Public Utility engineer of my broad experience. Address A. G. A.

Key No. 120.

WANTED—Position as assistant to engineer of small syndicate of gas and electric companies. Have had four years experience in engineering department of a holding corporation. Address A. G. A.

Key No. 121

WANTED—Position where nearly twenty years intensive study of carbonization, works operation, by-product recovery, and all details of apparatus and machinery peculiar to the manufacturing end of the business can be utilized to mutual advantage. Address A. G. A.

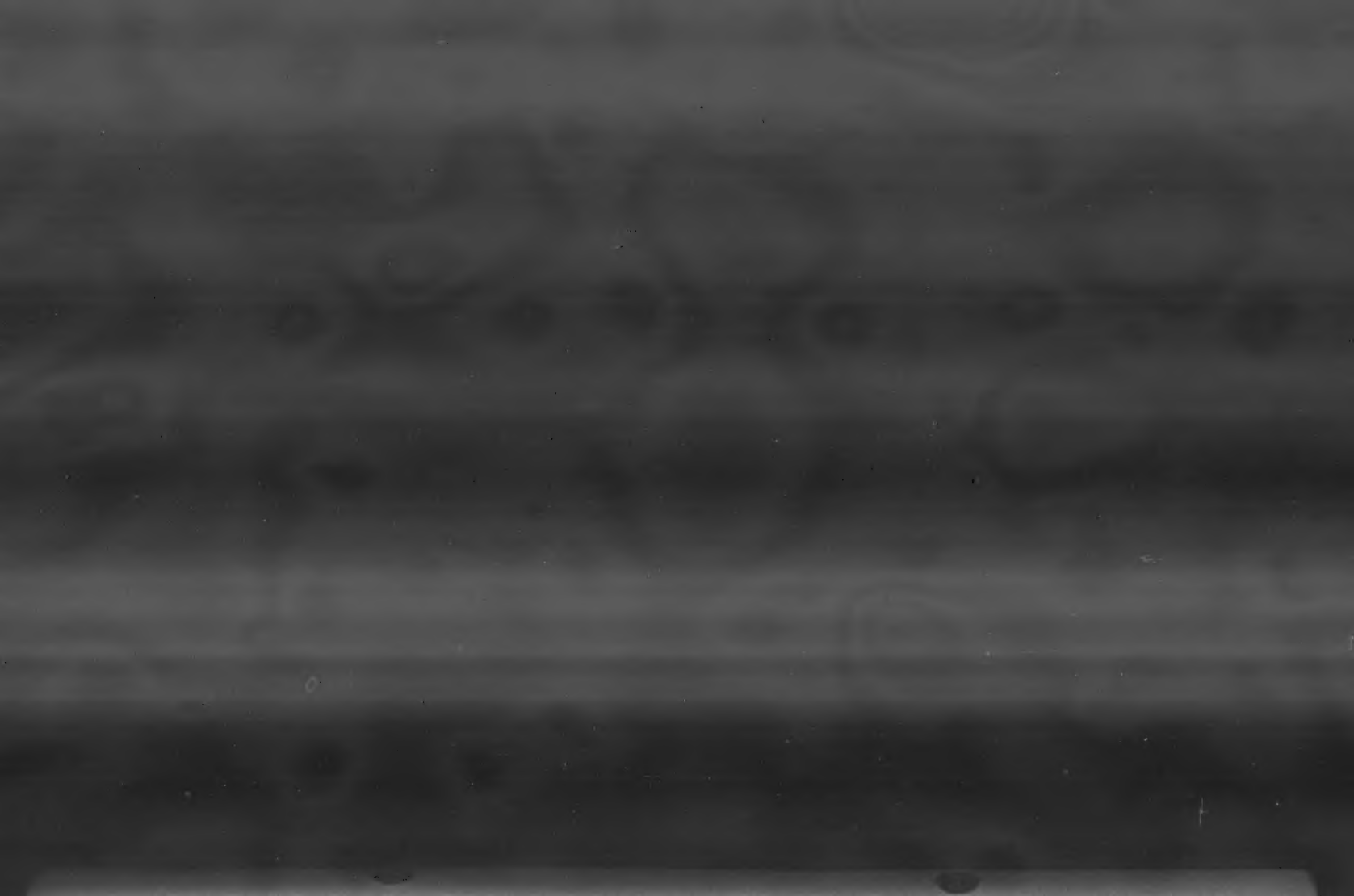
Key No. 122

WANTED—Position as Manager of a gas property, by a man who left such a position two months ago to become the Manager of a manufacturing company. Is 34 years of age; technical graduate, and experienced in all branches of the gas business Reports and data available from past experience; also the best of reference. Address A. G. A.

Key No. 123

EXECUTIVE AVAILABLE—An executive who has had some years experience in construction, operation and management of gas, electric power and traction properties will soon be open for engagement. Is specially competent in management of such properties in all branches including fare, rate, franchise, and valuation proceedings, labor matters and public relation. Will show record of successful work for fifteen years back with proofs to anyone interested. A. G. A. Monthly.

Key No. 124



EMPLOYMENT BUREAU—(*Continued*)

GAS APPLIANCE SALESMAN—Especially trained in water and house heating; 15 years' experience; desires selling position, either road or local, with aggressive appliance manufacturer or gas company. Will furnish best selling reference. Drawing account against commission. Address A. G. A. Key No. 124

WANTED—Position as salesman or sales manager with reliable gas or electric appliance manufacturer preferred. Address A. G. A. Key No. 126

WANTED—Position as manager or sales manager of gas, electric or combined property or group of properties. Now employed by company with which applicant has been associated for several years. Excellent reasons for wishing to make change which, together with highest references will be furnished to owners interested in securing thoroughly competent executive. Address A. G. A. Key No. 127

WANTED—Position as Superintendent of small company, in town of about 100,000 population or as Assistant Superintendent of some large holding company. New England or Central States preferred. Married, middle age, at present employed and can furnish good reference. Address A. G. A. Key No. 128

WANTED—Position as General Superintendent or Superintendent of Manufacture, coal or water gas; life experience in same, at present superintendent of small plant; A1 references. Salary $200 per month. Address A. G. A. Key No. 129

WANTED—Position as Manager of property in city of 20,000-25,000. Thorough knowledge of all departments, gained from twenty years' experience. At present employed, but desirous of change. Ample references furnished as to character and ability. Address A. G. A. Key No. 130

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST, 24, 1912, of American Gas Association MONTHLY, published monthly at Easton, Pa., for April 1, 1921.

STATE OF NEW YORK } ss:
COUNTY OF NEW YORK }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Louis Stotz who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Gas Association MONTHLY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, American Gas Association, Inc., 130 East 15th St., New York.
Editor, none.
Managing Editor, none.
Business Manager, Louis Stotz.

2. That the owners are: (Give names and addresses of individual owners, or if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.)

American Gas Association, Inc. No stock issued.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

There are none.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is not required.

(This information is required from daily publications only.)

(Signed) LOUIS STOTZ, *Business Manager.*

Sworn to and subscribed before me this 23d day of March, 1921.

[SEAL] (Signed) EDGAR S. MURRAY.

(My Commission expires March 30, 1922.)

AMERICAN GAS ASSOCIATION, INC.

HEADQUARTERS 130 EAST 15TH ST., NEW YORK, N. Y.

Officers and Directors.

PRESIDENT	CHARLES A. MUNROE	Chicago, Ill.
VICE-PRESIDENT	HOWARD BRUCE	Baltimore, Md.
TREASURER	H. M. BRUNDAGE	New York, N. Y.
SECTIONAL VICE-PRES.	R. B. HARPER	Chicago, Ill.
SECTIONAL VICE-PRES.	HAROLD S. SCHUTT	Philadelphia, Pa.
SECTIONAL VICE-PRES.	GEORGE S. BARROWS	Providence, R. I.
SECTIONAL VICE-PRES.	W. H. PETTES	Newark, N. J.
SECTIONAL VICE-PRES.	M. C. ROBBINS	New York, N. Y.

GEORGE B. CORTELYOU	New York, N. Y.
DANA D. BARNUM	Boston, Mass.
SAMUEL T. BODINE	Philadelphia, Pa.
R. B. BROWN	Milwaukee, Wis.
HENRY L. DOHERTY	New York, N. Y.
ARTHUR HEWITT	Toronto, Can.
C. L. HOLMAN	St. Louis, Mo.
J. B. KLUMPP	Philadelphia, Pa.
A. B. MacBETH	Los Angeles, Cal.
THOMAS N. McCARTER	Newark, N. J.
EMERSON McMILLIN	New York, N. Y.
H. A. NORTON	Boston, Mass.
GEORGE D. ROPER	Rockford, Ill.
W. G. GRIBBEL	Philadelphia, Pa.
R. C. CONGDON	Atlanta, Ga.
L. R. DUTTON	Jenkintown, Pa.
F. H. KNAPP	Pittsburgh, Pa.

Section Officers.

ACCOUNTING—Chairman	W. H. PETTES	Newark, N. J.
Vice-Chairman	EWALD HAASK	Milwaukee, Wis.
Secretary	H. W. HARTMAN	Ass'n Head'qtrs.
ADVERTISING—Chairman	M. C. ROBBINS	New York, N. Y.
Vice-Chairman	A. A. HIGGINS	Providence, R. I.
Secretary	CHAS. W. PERSON	Ass'n Head'qtrs.
COMMERCIAL—Chairman	H. S. SCHUTT	Philadelphia, Pa.
Vice-Chairman	A. P. POST	Philadelphia, Pa.
Secretary	LOUIS STOTZ	Ass'n Head'qtrs.
MANUFACTURERS—Chairman	GEO. S. BARROWS	Providence, R. I.
Vice-Chairman	JOHN S. DeHART	Newark, N. J.
Secretary	W. W. BARNES	Ass'n Head'qtrs.
TECHNICAL—Chairman	R. B. HARPER	Chicago, Ill.
Vice-Chairman	H. R. COOK, Jr.	Baltimore, Md.
Secretary	H. W. HARTMAN	Ass'n Head'qtrs.

SECRETARY-MANAGER	OSCAR H. FOGG	Ass'n H'dquarters
ASS'T SECRETARY-MANAGER	LOUIS STOTZ	Ass'n H'dquarters
ASS'T SECRETARY-MANAGER	PERCY H. HALL	Ass'n H'dquarters
ASS'T TREASURER	W. CULLEN MORRIS	New York, N. Y.